

UC-NRLF



B 3 993 758

BERKELEY
LIBRARY
UNIVERSITY OF
CALIFORNIA

357-

ENTOMOLOGY



DN/-

E. W. CLASSEY, F.R.E.S., A.B.A.
Natural History Bookseller
91, BERNARD STREET

Christopher Haggott

21 Octr 1891

with best wishes

BRITISH BUTTERFLIES,

By C. W. DALE.

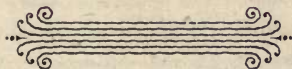
THE HISTORY OF OUR BRITISH BUTTERFLIES

CONTAINING—

A FULL BIBLIOGRAPHICAL NOTICE OF EACH SPECIES, WITH
COPIOUS EXTRACTS FROM THE OLD AUTHORS; AND FULL
DESCRIPTIONS OF ALL THE BRITISH SPECIES, THEIR EGGS,
CATERPILLARS, CHRYSALIDES AND VARIETIES, WITH A
NOTICE OF THEIR HABITS, LOCALITIES, FREQUENCY, &c., &c.

BY

C. W. Dale, F.E.S.



London :
JOHN KEMPSTER & Co.

ENTOMOLOGY



Bartlepool :

B. T. ORD, PRINTER, 69, HIGH STREET.



Q L 555

G 7 D 25

Entomol.

INTRODUCTION.

THE early history of science informs us of peculiar acquirements by which nations distinguished themselves from the rest of the world. Thus we are told of the skill of the Egyptians in astronomy, to which they were peculiarly led by their manner of reposing on open terraces under a cloudless sky. We learn also from the Old Testament, which if it were merely a human work would be the most venerable monument in the world, that Natural History was very early one of the sciences in the highest estimation. The manner in which Solomon's botanical knowledge is mentioned in the Bible, proves that to have been in those days the most esteemed, perhaps, of all learning whatever. Moses, moreover, appears to have possessed more than an ordinary knowledge of insects, if we suppose, as the ingenious remarks of Professor Lichtenstein render probable, that he distinguishes as clean insects the Fabrician genera *Gryllus*, *Locusta*, *Truxalis*, and *Acheta*, which a person unobservant of these insects would have confounded together. Allusion is oftentimes made in Holy Writ to insects of almost every one of the modern orders,—the locust, bee, moth, fly, lice, &c.; but not once to butterflies. The Prophets frequently introduce them as symbols of enemies that lay waste or oppress the church; and Solomon did not deem insects, those "Little things upon the earth," unworthy of his attention. He even advised the sluggard to go to the ant, to consider her ways, and be wise.

With Aristotle, however, begins the real history of science; and how much soever he may have erred on particular points, the greatness of his conceptions and the justness of his ideas on the whole, entitle him to our high veneration. His labours in the investigation of the animal kingdom have laid the foundation of the knowledge we now possess, and it cannot sufficiently be regretted that we have only an imperfect account of his discoveries. Theophrastus, the worthy disciple of Aristotle, has given us the first scientific views of the

vegetable and mineral kingdoms. These two great men stand unrivalled as the only philosophical naturalists of antiquity of whom we have any satisfactory knowledge.

Several ages after came Pliny, who has transmitted to us, so far as he was able, all that was known of natural history at the time in which he lived. Apollodorus, as Pliny informs us, was the first monographer of insects, since he wrote a treatise upon scorpions, and described nine species. Ælian also, amongst other animals, mentions insects. From him we learn incidently that artificial flies were sometimes used by Grecian anglers.

From the time of Pliny and Ælian, 1400 years rolled away, in which scarcely anything was done or attempted for entomology or natural history in general. During that long period the glimmer of only one luminary appeared to make a short and feeble twilight. In the middle of the thirteenth century Albertus Magnus devoted one out of twenty-one folio volumes to natural history. He gives a very correct account of the pit-falls of the Ant Lion. Insects he distinguishes by the name of Anulosa. He also calls them worms, describing butterflies as flying worms; and what is still more extraordinary, the toad and the frog, which he includes amongst his Anulosa, he calls quadruped-worms.

After the taking of Constantinople by the Turks in the middle of the fifteenth century, the light of learning, kindled by those of its professors who escaped from that ruin, appeared in the West. The Greek language then began to be studied universally; and in consequence of the coeval invention of the art of printing, various editions of the Greek works of the ancients were published: amongst the rest, those of the fathers of natural history. From the perusal of those works, the love of the sciences of which they treated revived in the West, and the attention of scientific men began to direct itself to the consideration and study of the works of their Creator. In the latter part of that century, a work entitled the "Book of Nature" appeared in the German language, in which animals and plants were treated of and rudely figured, as they were likewise most miserably in "Cuba's Ortus Sanitatis," published in 1485. In this work, insects and crabs were described under the three different denominations of Animals, Birds, and Fishes. Conrad Gesner, the greatest naturalist the world had ever seen since Aristotle, was born at Zurich, in 1516, and died in 1565. He founded and supported a botanic garden, kept a painter engraver in his service, had a very considerable library, and, according to Haller, was the first who ever formed a museum of natural history. Ulysses Aldromandus resembled Gesner in the indefatigable industry and zeal for the advancement of natural history. His memory

has been much honoured at Bologna, where he died in 1605. The great zoological work, which he left imperfect was finished after his death; and the first attempt at a separate and systematical arrangement of insects subsequent to the times of Aristotle, was made in the ponderous volumes. From him Linnæus borrowed the name *Polychloros*, which he bestowed on the Large Tortoise-shell Butterfly. About the same time botany began to be attended to in our own country. Turner published his "Herbal" in 1551, and in 1597 was printed the first edition of Gerard's "Herbal."

The work that is usually called Mouffet's, "*Theatrum Insectorum*" was produced in the seventeenth century, and was the fruit of the successive labours of several men of talent. Dr. Edward Wotton and the celebrated Conrad Gesner laid the foundation; whose manuscripts falling into the hands of Dr. Thomas Penery—an eminent physician and botanist of the Elizabethan age, much devoted to the study of insects—he upon this foundation meditated raising a superstructure which should include a complete history of these animals, but in 1589 he was snatched away by an untimely death. His unfinished manuscripts were purchased at a considerable price by Thomas Mouffet, a contemporary physician of singular learning, who reduced them to order, improved the style, added new matter and not less than 150 additional figures, but before he could commit his labours to the press he also died. The work remained buried in dust and obscurity till it fell into the hands of Sir Theodore Mayerne, one of the court physicians in the time of Charles I., who at length published it in 1634; and it was so well received that in the year 1658, Edward Topsel published an English translation of it. It is the first entomological publication extant in the British Isles, and is embellished with numerous wood engravings, accompanied by long, tedious, and sometimes superstitious descriptions of the articles they represent, which are systematically divided into two books and forty-two caputs. The 14th caput treats "*De Papilionilibus*," and occupies above twenty pages, in the margins of which are inserted, in an indented manner, 112 woodcuts of the rudest execution imaginable; yet, for the most part, perfectly intelligible to any person tolerably skilled in the science of entomology. In it the moths are called nocturnal butterflies, and the butterflies diurnal butterflies. Amongst the latter, one can recognise the following British species:—Swallow-tail, Scarce Swallow-tail, Orange-tip, Brimstone, Green-veined White, Clouded Yellow, Common Blue, Wall, Speckled Wood, Painted Lady, Red Admiral, Large Tortoise-shell, Small Tortoise-shell, Peacock, Silver Spotted Fritillary, and the Silver Spotted Skipper.

One of the most remarkable works of the century we are upon was pub-

lished at Liguity in the year 1603, by Casper Schwenckfield, a physician of Hieschberg, under the title of "*Theriotrophium Silesiæ*." This was probably the first attempt at a fauna that ever was made. In it animals are divided into quadrupeds, reptiles, birds, fishes, and insects.

In 1667, Christopher Merrett, M.D., one of the earliest Fellows of the Royal Society, published at London, his "*Pinax rerum Naturalium Britannicarum, continens Vegetabilia, Animalia, et Fossilia, in hac Insula reperta inchoatus*." It is the first publication which gives any account of British insects exclusively; and contains among other things, a brief catalogue of such as Dr. Merrett knew to be indigenous, each accompanied with a concise descriptive sentence, by way of a name. There are twenty-two descriptive sentences of butterflies; which, according to Mr. Haworth in his "*Review of Entomology*," published in the Transactions of the Entomological Society of London, for the year 1812, belong to the following species:—Large White, Black-veined White, Small White, Speckled Wood, Comma, Ringlet, Brimstone, Wall, Green-veined White, Small Tortoise-shell, Marbled White, Meadow Brown, Wood White, Purple-edged Copper, Green Hairstreak, Common Blue, Large Heath, Brown Skipper, Dark Pearl-bordered Fritillary, Small Heath, and the Silver Spotted Skipper. Mr. Haworth goes on to say "That Merrett should have been acquainted with the Purple-edged Copper is indeed singular; but his words, "*Externis purpurascentibus*," by which I understand *externis marginibus*, &c., absolutely and pointedly agree with it; and as absolutely and pointedly disagree with every other known British species."

At page 197 of the *Pinax*, we read exactly as follows: "*Papilio, vel diurnus, a Butterfly, vel nocturnus, a Miller, qui phalæna dicitur cujus species sequuntur. Phalæne major? Exigua argentea nigris maculis rotata, a Moth*." Amongst other insects Dr. Merrett mentions *Staphylinus*, the poisonous caterpillar; *Formica*, Ant, *Emet*, or Pismire; *Gryllus*, Cricket; *Locusta* Grasshopper; and *Cicindela*, a Glowworm.

In 1662, Goedart published in Middelburg his "*Metamorphosis et Historia Naturalis Insectorum*," which was done into English and methodized with the addition of notes by Martin Lister in 1685. Goedart is stated to have spent forty years of his life in attending to the proceedings of insects. The improvement he effected in the drawing and engraving of them was great, for his figures, though sometimes incorrect, were far superior to those of his predecessors. He appears also to have been the first author who gave any figures of the caterpillars and chrysalides. The British butterflies he figures are the Peacock, Large Tortoise-shell, Small Tortoise-shell, Painted Lady,

Large White, Small White, and Red Admiral. To the general work Martin Lister added a short appendix on British spiders.

A very inferior book of nature belonging to this century is that by Hollar, published in 1674. In it he gives figures of such fabulous animals as a Flying Dragon and a Griffin. There is also a scanty mention of insects in Nehemiah Grew's "*Rarities of Gresham College*," published in 1681.

Science received a vast impetus by the establishment of the Royal Society, which, from a small beginning at Oxford about the year 1645, made rapid advances when removed to the metropolis in 1662. This learned body bestowed great attention from the beginning upon the physiological part of natural history. The names of Boyle, Evelyn, Hook, and Needham are among the first members of this society. Mr. Willoughby, also, was one of the original fellows, although his friend Ray was not admitted till the year 1667. Dr. Lister, the great conchologist, was very early associated with it, as well as the vegetable physiologist, Dr. Grew.

Many similar institutions were set on foot throughout Europe, as the Imperial Academy *Naturæ Curiosorum*, begun in 1652. An academy was instituted at Paris, in 1666, and another some years after at Montpellier, very similar to the Royal Society of London, with which the greatest men in Europe have always been proud to be associated.

One of the most important events of this century was the complete exposure and refutation of the absurd doctrine of equivocal generation, which had maintained its ground in the schools of philosophy from the time of Aristotle. Our own immortal Harvey was the first who dared to controvert this irrational theory; and his dictum—*Omnia ex ovo*—was copiously discussed and completely established by two of the ablest physiologists that Italy has produced, Redi and Malpighi. The works of Swammerdam also are full of curious information, and will sufficiently reward those whose patience is not to be exhausted by his tedious heavy style.

Towards the end of the century appeared two great naturalists, our countrymen, Willoughby and the illustrious Ray.

John Ray, the son of a blacksmith, was born in 1628, at Black Netley, in Essex. He was bred up to the Church, and finally became one of the brightest ornaments in the history of our science. He was the author of many invaluable works on divinity, morality, and botany. At the advanced age of 75 he began his work on insects, the celebrated "*Historia Insectorum*," for which he had been accumulating materials from 1690 to 1700, but being snatched away from his labours by the hand of death on the 17th of January, 1705, the work, which was nearly ready for the press, was published post-

humously by his friend Dr. Derham, at the command of the Royal Society, in 1710. To it is subjoined "Appendix de Scarabæis Britannici, auctore M. Lister, F.R.S., ex. M.S.S. Musæi Ashmoleani," It appears from Ray's letters that his friend Willoughby drew up a history of insects and worms, which probably formed the ground work of the "Historia Insectorum," concerning which he says, "The work which I have now entered upon is indeed too much for me, I rely chiefly on Mr. Willoughby's discoveries and the contributions of friends." The principal of these were Dale, to whom he bequeathed his collection of insects; Vernon, who in a letter from Mr. Brume to Mr. Rawlins, June 14th, 1735, in the Bodleian Collection, is stated to have followed a butterfly nine miles before he caught him; Petiver, Jezreel Jones, Antrobus, and Dandridge. The descriptions given in the "Historia Insectorum," especially considering the dark ages of this science in which they were written, are masterpieces of clearness and precision, and such as, in general, render it tolerably easy to ascertain the articles they belong to; although unaccompanied with figures: but with respect to the arrangement and distribution of its materials, the work is in both these essential points, unquestionably very far inferior to that of Linnæus; and indeed, in some particulars, is not much superior to its predecessors. For, like them, it also incongruously blends the Linnæan class of Vermes with the genuine and natural one of insects. He estimates the number of butterflies observed by him and his friends in England to be fifty. The species he describes are:—Swallow-tail, Scarce Swallow-tail, Brimstone, Clouded Yellow, Large Cabbage White, Small Cabbage White, Green-veined White, Marbled White or Half-Mourner, Bath White or Greenish-marbled Half-Mourner, Lesser Tortoise-shell, Greater Tortoise-shell, Comma, Silver-streaked Fritillary, Greater Silver-spotted Fritillary, Queen of Spain or Lesser Silver-spotted Fritillary, Light Pearl-bordered or April Fritillary, Dark Pearl-bordered or May Fritillary, Glanville Fritillary, Marsh Fritillary, Duke of Burgundy or Mr. Vernon's Small Fritillary, Painted Lady, Peacock's Eye, Wall or Golden-marbled Butterfly with black eyes, Meadow Brown, Hedge Brown, Small Heath, Small Copper, Small Skipper, Red Admiral, Purple Emperor, White Admiral, Speckled Wood, Black-eyed Marble, Ringlet, Purple Hair-streak, Brown Hair-streak, Common Blue, Heath Blue, Chalk-hill Blue, Azure Blue, Mazarine Blue, Brown Skipper, Spotted Skipper, and Green Hair-streak. He also adds a few exotics found in the museums or cabinets of the curious in and about London.

In a letter to Mr. Derham, bearing the date of 1703, Mr. Ray writes "I have for some years together been a diligent searcher out of Papilios,

diurnal and nocturnal, and though I have found and described near upon 300 species, great and small, within the small compass of four or five miles; yet came I not to the end of them. Now, the genus of beetles is as numerous as that of the Papilios, if not more. The flies (so at present I call all insects that have naked and smooth, not farinaceous wings), both bipennes and quadripennes, are in a manner infinite, nor has their history been with diligence prosecuted by any man that I know of, except Mr. Willoughby; whose manuscript I hope to procure." In another letter he writes, "As for books about insects, written in, or translated into Latin, I know none but Aldromandus, Mouffet, Johnson, and Gœdartius, except Malpighius *de Bombyce*, and Dr. Lister *de Araneis*. The best general history, or account of insects, is that of Swammerdam, written in Low-Dutch, and translated into French." One of his friends, James Petiver, published at London a variety of miscellaneous zoological, botanical, and other treatises, illustrated by several thousand figures, each of which is (like the items of Merrett's *Pinax*) explained by a concise and descriptive sentence, which served as a name. He also was the author of one work, entirely entomological, entitled "*Papilionum Britannia Icones, Nomina, &c.*," of about eighty English butterflies, being all that have hitherto been discovered in Britain, by James Petiver, F.R.S., London, 1717, folio. It is a valuable publication to the student in British lepidoptera, the figures being (for these times) well executed.

The species are fifty in number, viz: Black-veined White, Great Cabbage White, Small Cabbage White, Green-veined White, Wood White, Brimstone, Clouded Yellow or Saffron, Swallow-tail or Royal William, Orange-tip or White Marbled, Bath White or Vernon's Greenish Half-Mourner, Marbled White or Common Half-Mourner, Red Admiral, White Admiral, Silver-streaked Fritillary, Great Silver-spotted Fritillary, High Brown Fritillary, Heath or Straw May Fritillary, Dark Pearl-bordered Fritillary, Duke of Burgundy or Vernon's Small Fritillary, Light Pearl-bordered Fritillary, Marsh or Dandridge's Black Fritillary, Queen of Spain or Lesser Spotted Fritillary, Glanville or White Dullidge Fritillary, Great Tortoise-shell, Lesser Tortoise-shell, Comma, Small Copper, Spotted Skipper or Brown Marsh Fritillary, Brown Skipper or Handley's Small Brown Butterfly, Painted Lady, Brown Hair-streak, Purple or Ray's Blue Hair-streak, Peacock, Albin's Hampstead Eye, Black-eyed Marble or Tunbridge Grayling, Speckled Wood or Enfield Eye, Wall or London Eye, Meadow Brown or Eye, Hedge Brown or Eye, Ringlet or Brown Eye, Small Heath or Silver-edged Heath Eye, Chalk-hill Blue or Pale Blue Argus, Common Blue or Blue Argus, Heath Blue or Silver-edged Blue Argus, Brown Argus, Azure or Blue Specked Butterfly,

Green Hair-streak or Holly Butterfly, Small Skipper or Spotless Hog, and the Large Skipper or Cloudy Hog.

The remaining thirty figured by Petiver, are varieties or the other sex of the above. One species, Albin's Hampstead Eye, is a native of Australia, and must have been introduced by Petiver through a mistake. The additions in his work to the list of British Butterflies are the High Brown Fritillary, Heath Fritillary, Brown Argus, Large Skipper, and Small Skipper. Both Petiver and Ray gave English names to many of the species, some of which have been changed since their time.

The publications of Petiver have been of essential service to zoology and botany, but they have become scarce, though a second edition of them, entitled "*Petiveri Opera*," was published in 1764. His museum after his decease, which happened in April, 1718, was purchased by his worthy friend Sir Hans Sloane, for no less than £4,000; a great sum in those days, which at once proves the goodness of the Petiverian collection, and the affluence of the Baronet. It eventually went, along with the vast stores of natural productions amassed by Sir Hans Sloane, to form the basis of that national institution, the British Museum.

Sir Hans Sloane, in the year 1725, published the second volume of his "*Natural History of Jamaica*," including the insects found in that Island.

In the year following was published in Holland, one of the most splendid entomological works ever published, by Madame Marie Sibilla Merian, in the "*Transformations of the Insects of Surinam*," a large folio volume with finely drawn and highly coloured plates of insects, plants, and reptiles.

The work which next arrests our attention is that of Eleazar Albin, a painter of no small ability, who in the year 1731, published at London, a "*Natural History of English Insects*," illustrated with 100 copper-plates, engraven from life; and of which a second edition appeared in 1749, with large notes, and many curious observations by W. Dereham, D.D., Fellow of the Royal Society. This is the first work with coloured illustrations of English insects, and it contains principally, but not exclusively, such lepidopterous insects as the author, or his friends, had reared from caterpillars; exhibiting them picturesquely feeding on their proper plants, and in all phases, or mutations: the whole highly coloured, and accompanied by descriptions in the English language, but without names. This last I mention as Guenee has unadvisedly given Albin as an author of names. The butterflies he figures are the Large Cabbage White, Black-veined White. Brimstone, Red Admiral, Peacock, Small Tortoise-shell, Brown Hairstreak, Green Hairstreak, Painted Lady, Large Tortoise-shell, Comma, Meadow Brown,

Purple Hairstreak, Small Cabbage White, and the Green-veined White. Albin dedicates the plates to various different persons (a custom which has unfortunately fallen out of use in the present century), who bore the expense of the plates; and the entire work to her Royal Highness the Princess of Wales.

In the preface he informs us that Mr. Dandridge employed him in painting caterpillars, and that he painted a lot of caterpillars and flies for Mr. How, and likewise several things relating to natural history for Sir Hans Sloane. Also that the Duchess Dowager of Beaufort employed him in the same manner, and that she was the first to persuade him to undertake his work, and encouraged him by procuring subscriptions from persons of the first quality; amongst them Henry Bentinck, Earl of Portland, father-in-law of the celebrated Duchess of Portland.

I may as well mention here that I have in my possession Albin's original drawings.

He also published in 1736, a Natural History of Spiders, and other curious insects, 200 in number.

In 1739, Professor Bradley published, at London, his "Philosophical Account of the Works of Nature." At page 190 of his work, he informs us that the following were very eminent collectors of insects: "the Duchess of Beaufort, who has bred a greater variety of English insects than were ever rightly observed by any one person in Europe; Sir Hans Sloane; Mr. Vincent; Dr. Ruysch; and Mr. Sebra have surprising collections, where we may observe many thousands of foreign insects; and Mr. Dandridge, who has so industriously collected the insects of our own country." Bradley gives a few engravings of insects, but does not appear to have much advanced the science.

We are now arrived at that period in the history of Entomology, in which it received that, with respect to its general outline, which has been preserved ever since. Swammerdam had altogether deserted the system of Aristotle, and Ray mixed it with that of his predecessor. But two years after the death of Ray was born the greatest naturalist the world has ever been graced with, the immortal Linnæus. This illustrious philosopher was born on the 24th of May, 1707, in the little village of Roëshult, in Sweden, and imbibed a taste for entomology almost as early as botany. In the first edition of his "Systema Naturæ," published in 1735, and contained in only fourteen folio pages, he began to arrange the three kingdoms of nature after his own conceptions. But this initiatory sketch, as might be expected, was very imperfect; and with respect to insects, was extremely inferior to what Ray had effected; for he puts into one order, to which he gives the name of

Angioptera, the Lepidoptera, Neuroptera, Hymenoptera, and Diptera. In this work, however, generic characters were first given. In successive editions he continued to improve upon this outline: in the fourth, he finally settled the the number and denominations of his orders, and also their limits. His system, being founded upon the absence or presence and characters of the organs for flight, is in some degree a republication of the Aristotelian, and may be called the Alary system. The 2nd edition was published in 1740, the 3rd in 1740, the 4th in 1744, the 5th in 1747, the 6th in 1748, the 7th in 1748, the 8th in 1753, the 9th in 1756, the 10th in 1758, the 11th in 1760, the 12th in 1766.

Quite a new turn was given to the science of natural history by the publication of the "*Systema and Fundamenta Botanica* of Linnæus" in 1735. Nor were the learned world determined how they should receive these extraordinary productions, when in 1737 the same author, without any other support than his own transcendent merit, fixed the attention of all Europe by his "*Critica Botanica*," "*Genera Plantarum*," "*Hortus Cliffortianum*," "*Flora Lapponica*," and "*Methodus Sexualis*;" five works, the produce of one year, each of which would alone have been sufficient to have immortalized its author, and in the composition of which a man's whole life might have been thought to have been usefully employed. But in no respect were the labours of Linnæus more beneficial to science and zoology in particular, than when he undertook to describe the animals of his own country. His "*Fauna Suecica*," published in 1746, is an admirable exemplar, which greatly stimulated the zoologists of other countries to study their native productions. The last public exertion of Linnæus was a beautiful oration delivered before the University of Upsala, when he resigned his office of Rector. This was in the latter part of the year 1772, in the 65th year of his age, six years before his death, which took place on the 10th January, 1778.

Before his death he was elected a member of twenty academies, including the three of his own country, and in 1753 was dubbed a Knight of the Polar Star by the King of Sweden's own hand. Linnæus had many pupils, whom he persuaded to travel all over the world; he himself travelled over Lapland, all Sweden, part of Norway, Denmark, Germany, Holland, France, and England, in search of knowledge. The most useful of his works to the Entomologist are the "*Fauna Suecica*" and the "*Systema Naturæ*." In the last edition of the latter he has included more than 3000 species of insects, classed them, divided them into genera and species, described them, marked the places where they are to be found, the plants they feed on, their transformations, and cited the authors who have treated of them.

Before the time of Linnæus, names were given to insects somewhat indiscriminately, and, not unfrequently, they were but brief descriptions. Thus, Petiver, in 1717, called the Brimstone Butterfly "*Papilio sulphureus*;" Ray, in 1710, called the Clouded Yellow "*Papilio croceus, apicibus nigricantibus*," and the Bath White "*Papilio leucomelanos Cantabrigiensis*;" Albin, in 1731, called the Black-veined White "*Papilio albus venis nigris*." So, too, in 1769, Wallis, in his "Antiquities and Natural History of Northumberland," called the Comma "The brown and gold butterfly with lacinated wings." Linnæus devised a system of nomenclature that needed but two words for each species. The second of these was the specific, whilst the first showed to what genus the particular species belonged. The Lepidoptera he divided into only three genera: *Papilio*, *Sphinx*, and *Phalæna*. Instead of giving in every instance a fresh set of names, he adopted many from the ancients, such as *Gryllo-talpa*, from Aristotle, for the Mole-cricket; *Cossus*, from Pliny, for the Goat Moth; and *Polychlorus*, from Aldrovandus, for the Large Tortoise-shell Butterfly.

Between the 10th edition of the "*Systema Naturæ*" and the 12th, appeared the following, viz.: Nicole Poda's "*Insecta Musei Græcensis, quæ in ordines, genera et species juxta Systema Naturæ Caroli Linnæi digessit*," in 1761; Sepp's "*Nederlandsche Insecten*," commenced in 1762, a beautiful work in which not only the perfect insects, caterpillars, and chrysalides are figured, but also the eggs; Scopoli's "*Entomologia Carniolica Methodo Linnæana*," in 1763, of which I possess a copy with plates; and Geoffroy's "*Historie Des Insects*," in 1764. Geoffroy is principally celebrated as the author of the method generally adopted by modern entomologists, of dividing the Coleoptera into primary sections, according to the number of the joints of their tarsi. His work is further serviceable by indicating many genera not defined by Linnæus. Scopoli, under the name of *Papilio macaronius*, has figured and described a Myrmelion, one of the Neuroptera. His specific names also are heavy, and where altered from the Linnæan are mostly altered for the worse. The liberty he has taken in changing names is unworthy of him, and injurious to science. Under the heading of *Papilio alexis*, he appears to have grouped together two or three distinct species, so that it is impossible to tell to which the name belongs.

For these and other reasons, the 12th edition of the great work of Linnæus, the "*Systema Naturæ*," was decided upon for the starting point of our nomenclature. That this decision is wise there should be no doubt. Linnæus was an exceptionally able man. The binomial system of nomenclature was but an adjunct to the great scheme of arrangement and order

with which he replaced the chaos of an earlier time. In giving names he knew what he was about better than we can know, and when he thought it better to alter a name he had adopted before, or that had been used by others, we may be quite sure he had good reasons for the alteration. Surely the carefully revised completion of a great work is a safer starting point than an earlier and admittedly imperfect edition. It must be borne in mind that I am referring exclusively to the science of entomology, for in the sister science of botany, plants had been divided into species and genera long before the time of Linnæus. For instance, Ray, in his "*Catalogues Plantarum Angliæ et Insulaeum Adjacentium*," published in 1677, divided the perfect plants of our islands into 23 genera.

In a letter to Haller, bearing the date of June 8th, 1737, Linnæus writes: "Those who come after us, in the free republic of Botany, will never subscribe to authorities sanctioned only by antiquity, if we retain such intractable names as *Monolasiocallenomenophyllum* and *Hypophyllocarpodendrium*; why should we therefore retain barbarous or mule names, or names distinguished only by tails. Witness: *Alsine*, *Alsinoides* of Ray, *Alsinella* of Dillenius, *Alsinastrum* of Vaillant, *Alsinastroides* of Kramer, *Alsinastriformis* of Plukenet, *Alsinanthemos* of Ray, and *Alsinanthemum* of Kramer. I could not help laughing when I saw a certain Botanist establish a genus by its tail alone, calling *Convolvuloides*, because it had an upright stem. Why does the termination *oides* displease? Because it is the asylum of ignorance. Botanists seem to me never to have touched upon nomenclature as a subject of study, and therefore this path of their science remains still unexplained."

If we turn to our own British Isles again we find that, in the year of our Lord 1742, Benjamin Wilkes published at London twelve folio copperplates of the more showy English lepidoptera, disposed in imitation of pictures; with an engraved emblematic title, highly ornamented, dedicating the work to the Aurelian Society of that day. The English names of the insects, and often the names of the plants on which they feed, together with the times and places they are found in, are likewise engraved at the foot of each plate, but no letterpress appears to accompany them. The butterflies are the Peacock, White Admiral, Swallow-tail, Red Admiral, High Brown (or more properly) Silver-spotted Fritillary, Large Tortoise-shell, Ultramarine or Common Blue, Purple Hair-streak, Marmoris or Marbled White, Darkened Green or High Brown Fritillary, Comma, Painted Lady, Rock Underwing or Black-eyed Marble, Purple Emperor, Small Pearl-border or Dark Pearl-bordered Fritillary, Great or Silver-striped Fritillary, Clouded Yellow, Small Tortoise-shell, Lady of the Woods or Orange-tip, and the Orange Field Butterfly or Hedge Brown.

This appears to be the only English entomological work during a period of twenty years, the minds of the men of science being wholly occupied with the theories and views of the celebrated Sir Isaac Newton.

We next arrive at a name memorable in the annals of British entomology, that of Moses Harris, who has contributed more, perhaps, than all our entomologists who preceded him, towards the knowledge and natural history of British insects. He was also one of the first who endeavoured to form an Aurelian Society in this country, for the purpose of recording and diffusing the knowledge he had acquired, and of which he was chosen to be the secretary. The first of his works—"The Aurelian or a Collection of Butterflies and Moths and the Plants on which they feed and are found, Delineated and Coloured, with an Explanation thereof," was published in folio, at London, in the year of our Lord 1766.

The butterflies in the work are 21 in number, viz: The Comma, Small Tortoise-shell, Purple Emperor, Red Admiral, Peacock, Black-veined White, Purple Hair-streak, Painted Lady, Marmoris or Marbled White, Grand Surprise or Camberwell Beauty, Glanville Fritillary, Little Gate-keeper, Green Fly or Hair-streak, Dark Green or Silver-spotted Fritillary, Dishclout or Greasy or Marsh Fritillary, High Brown Fritillary, Clouded Yellow, Wood White, and White Admirable.

The Camberwell Beauty is an addition to the British Fauna.

Now comes a very important period, that of the introduction of the Linnæan system into England, for in 1769, John Berkenhout, M.D., published in English, in small octavo, the first volume of his "Outlines of the Natural History of Great Britain," containing the animal kingdom; and amongst other things, as many insects as he could ascertain, arranged according to the Linnæan system, amounting to about 600 species. The butterflies he includes are as follows:—1, *Machaon*, Royal William or Swallow-tail; 2, *Podalirius*; 3, *Cratægi*, White Butterfly, with black veins; 4, *Brassicæ*, Great White Cabbage; 5, *Rapæ*, Small White Cabbage; 6, *Napi*, White Butterfly, with green veins; 7, *Cardamines*, Orange-tip; 8, *Hyale*, Spanish Butterfly, more properly *Edusa*, Clouded Yellow; 9, *Rhamni*, Brimstone; 10, *Hyperantus*, Brown-eyed or Ringlet; 11, *Io*, Peacock; 12, *Mæra*, Great Argus, more properly *Megara*, Wall; 13, *Ægeria*, Wood Argus or Speckled Wood; 14, *Galathea*, Marble; 15, *Semele*, Black-eyed Marble; 16, *Jurtina*, Meadow Brown; 17, *Cardui*, Painted Lady; 18, *Iris*, Emperor of the Woods or Purple High-flyer; 19, *Antiopa*, Willow Butterfly or Camberwell Beauty; 20, *Polychlorus*, Great Tortoise-shell; 21, *Urticæ*, Small Tortoise-shell; 22, *C-album*, Comma; 23, *Atalanta*, Red Admiral;

24, *Lucina*, Small Fritillary or Duke of Burgundy; 25, *Maturna*, Heath Fritillary, more properly *Athalia*; 26, *Cinxia*, Plantain or Glanville Fritillary; 27, *Paphia*, Great or Silver-striped Fritillary; 28, *Aglaia*, Great Fritillary with silver spots; 29, *Lathonia*, Less Silver-spotted Fritillary or Queen of Spain; 30, *Euphrosyne*, April or Light Pearl-bordered Fritillary; 31, *Betulae*, Brown Hair-streak; 32, *Quercus*, Purple Hair-streak; 33, *Argus*, Blue Argus, more properly *Icarus*; 34, *Argiolus*, Azure Blue; 35, *Pamphilus*, Small Heath or Little Gate-keeper; 36, *Rubi*, Green Hair-streak; 37, *Phlaeas*, Small Golden Black-spotted Butterfly or Small Copper; 38, *Comma*, Chequered Hog or Pearl Skipper; 39, *Malva*, Grizzle or Brown Marsh Fritillary, more properly *Alveolus* or Spotted Skipper.

In 1770, the following year, John Reinhold Forster, published at Warrington, a "Catalogue of British Insects." This was a mere catalogue of Latin names, but the most extensive yet made, amounting to a thousand species.

In 1772, "The Naturalist and Traveller's Companion," by Dr. Lettsom, was published at London, giving directions how to collect and preserve all sorts of natural productions, and is a very useful book especially to beginners.

We now come to a year fertile in the produce of entomological works, for in 1773, Yeats, published at London, his "Institutions of Entomology, being a translation of Linnæus' 'Ordines et Genera Insectorum: ' or systematic arrangement of insects, collated with the different systems of Geoffroy, Schaffer, and Scopoli." This is an excellent publication for its time. In it, Yeats writes: The division of the butterflies into families, from the circumstances chosen by Linnæus, seems liable to many objections: the family of the *Plebeii*, in particular, is very inaccurate, and contains insects very different from one another. Scopoli and Geoffroy have divided this genus into different families from the number of their feet; a method which cannot easily be pursued in cabinets where exotic butterflies are admitted, these parts being generally destroyed before such insects reach Enrope. The other circumstances from which Geoffroy has taken his divisions into families, viz., the form of the caterpillars, is totally impracticable, except where the collector admits no other butterflies into his cabinet, but such as he himself possessed in the caterpillar state. Geoffroy has, besides changing the orders of the Linnæan system, formed from the different families of Linnæan genera many new genera, some of them very judiciously, others perhaps without sufficient grounds. Schæffer, in his 'Elementa Entomologiæ,' printed at Ratisbon, in 1776, has followed Geoffrey with very few and inconsiderable variations. I should have been glad to have given some account of the system of Poda, a Jesuit, a work much praised by Scopoli, but have not

been able to procure it, nor learn how or in what he differs from Linnæus."

In 1773, appeared the splendid work of Benjamin Wilkes, entitled, "One hundred and twenty plates of English Moths and Butterflies." The insects are figured after the manner of Albin, but far more sumptuously: and are accompanied by English descriptions of the caterpillars and chysalides, but not of the perfect state; and are entirely destitute of Latin, generic, and specific names, and references to the inestimable works of Linnæus. The butterflies figured are the Swallow-tail, Brimstone, Black-veined White, Small Garden White, Green-veined White, Large Garden White, Orange-tip or Lady of the Woods, Marble White or Marmoris, Meadow Brown, Wall or Great Argus, Speckled Wood or Wood Argus—a foreign species of Skipper feeding on mallow, figured in mistake for the Grizzle or Spotted Skipper, Red Admiral, Peacock, Painted Lady, Great Tortoise-shell, Small Tortoise-shell, Comma, Great Silver-striped Fritillary, Glanville or Plantain, Heath Fritillary, Willow or Camberwell Beauty, Small or Marsh Fritillary, Great Silver-spotted Fritillary, Purple Hair-streak, Brown Hair-streak, Green Hair-streak, Common Blue, and the Purple High-flyer or Emperor of the Woods.

Wilkes, in his "Preface," informs us that he has been greatly assisted by that well-known and ingenious naturalist, Mr. Joseph Dandridge; to whose noble collection he had free access to during his lifetime, and also the liberty of making what use he thought fit of his curious remarks on those subjects, which were the fruits of no less than forty years experience: and that he must also acknowledge that he has made use of the drawings of some caterpillar and flies which were published in 1746, by J. A. Rosel, at Nuremburgh, in Germany. Wilkes also has introduced a fresh system of classification built upon the caterpillar state. The butterflies he has divided into four classes, viz: 1, Smooth caterpillars; 2, Having little hair; 3, Armed with spikes 4, Shaped like wood-lice.

At the same period Dr. Drury published a beautiful work on "Entomology," containing comprehensive descriptions in English and French, with an index of Linnæan names at the end, and a great many coloured upper-plates of such interesting exotic insects, as had not before been, or were insufficiently figured. The icons were executed by Moses Harris in his best style, and are far superior to any of their predecessors in Britain.

Mr. Drury's cabinet was one of the most extensive hitherto made, and is said to have contained, in species and varieties, the number of 11,000 species. He spared no pains or cost in getting them together, and like Petiver, sent printed instructions, in various languages, all over the world for that purpose, by captains of ships and others. Soon after his death, in 1810, his collection

was sold by auction, and produced £650 : one single butterfly selling for no less than twelve guineas.

The above mentioned Moses Harris has contributed more than all the Entomologists who preceded him, towards the knowledge and natural history of British insects.

In 1775, he published the "Aurelian's Pocket Companion," containing a catalogue of four hundred English Moths and Butterflies, the food of their respective caterpillars, the time of changing into chrysalides, appearance in the winged state, and places where they are usually found, together with a concise description of each, and their dimensions, in inches and quarters; also the Linnean names in the last column with the number annexed to each species, as it is numerically placed by Linnæus in the 12th edition of the "Systema Naturæ." The Linnean names given are: *Camilla*, *Atalanta*, *Argiolus*, *Rhamni*, *Jurtina*, *Rubi*, *C. album*, *Virgaurea*, *Iris*, *Paphia*, *Adippe*, *Aglaiæ*, *Euphrosyne*, *Maturna*, *Lathonia*, *Cinxia*, *Lucina*, *Semele*, *Megara*, *Pamphilus*, *Cardui*, *Cardamines*, *Io*, *Hyperantus*, *Polychloros*, *Urticæ*, *Comma*, *Tages*, *Betulæ*, *Quercus*, *Antiopa*, *Machaon*, *Brassicæ*, *Rapæ*, *Cratægi*, *Napi*, *Ægeria*, *Galathea*, *Mæra*, and *Hyale*. Of these, *Camilla*, *Virgaurea*, *Maturna*, and *Mæra*, are not British, and are simply given in mistake for *Sibylla*, *Phlæas*, *Athalia*, and *Tithonus*.

The English names stand in the first column, and are in alphabetical order, thus:—Admirable White, Admirable, Blue Azure, Blue Common, Blue Argus, Blue Clifden, Blue Chalkhill, Blue Silver-studded, Brimstone, Brown Meadow, Bramble or Green Fly, Comma, Copper, Emperor Purple, Fritillaria Silver-wash, Fritillaria High Brown, Fritillaria Dark Green, Fritillaria Pearl Border, Fritillaria Pearl Border Likeness, Fritillaria Greasy, Fritillaria Queen of Spain, Fritillaria Glanville, Fritillaria Duke of Burgundy, Fritillaria Small Pearl Border, Grayline, Gristle or Spotted Skipper, Keeper Large Gate, Keeper Small, Lady Painted, Lady of the woods or Orange-tip, Peacock, Ringlett, Tortoise-shell Large, Tortoise-shell Small, Skipper Large, Skipper Small, Skipper Dingy, Skipper Pearl, Streak Brown Hair, Surprise Grand, Streak Dark Hair, Tail swallow, White Large Garden, White Small Garden, White Green-veined, White Black-veined, White Wood, White Marbled, Wood Speckled, Wall, Yellow Clouded, Yellow Pale Clouded : 53 in all.

In 1778, was published a second edition of "The Aurelian: or Natural History of English insects, namely, Butterflies and Moths," with great additions; and in 1782, Moses Harris published his "Exposition of English Insects," which is illustrated by 51 copperplates, whereon are depicted about 500 figures of insects, of all the various orders, exclusive of butterflies. He

was likewise the author of a little work, without a date, entitled "An Essay, preceding a Supplement to the Aurelian, wherein are considered the tendons and membranes of the wings of butterflies," in which he ingeniously gives a method of arranging the Papiliones into natural families, from the difference of structure observable in the nerves of their wings.

In 1781, appeared, in English and French, "The Genera Insectorum of Linnæus," exemplified by various specimens of English insects, drawn from nature. This was the first work which made known, by figures, the system of Linnæus on insects, and the various genera which it contained.

About this period, William Curtis, a celebrated botanist, published "An Essay on the Brown-tail Moth," "Instructions for Collecting and Preserving Insects," and a "Translation of the Fundamenta Entomologiæ of Linnæus," illustrated with copperplates and additions, and to which is prefixed a chronological catalogue of entomological authors; this latter was published in 1772.

In 1785, Matthew Martyn published at Exeter, "The Aurelian's Vade Mecum," containing an English alphabetical and Linnæan systematical catalogues of plants affording nourishment to butterflies, hawk moths, and moths in the caterpillar state, collected from various authors.

If we turn again to the Continent, we find that in 1766, Hufnäger published descriptions of butterflies and moths in a Berlin magazine; but as they are poor even for the age, they have been ignored by all the greatest entomologists as being injurious to science and likely to be misunderstood. Pallis' descriptions in 1771 are likewise bad. We next come to the celebrated De Geer, who united in himself the highest merit of almost every department of that science. Both as a systematist, an anatomist, and physiologist, and as the observant historian of the manners and economy of insects, his "Memoires pour servir à l'Histoire des Insectes" is above all praise. His system is contained in a posthumous volume published in 1778.

We are now arrived, if its consequence be considered, at one of the most important epochs of the science. Fabricius, a pupil of Linnæus, who highly estimated his entomological acquirements, thinking that the system of his master was not built upon a foundation sufficiently fixed and restricted, conceived the idea of doing for Entomology what the latter had done for Botany. As the learned and illustrious Swede had assumed the fructification for the basis of his system in that science, so the emulous and highly gifted Dane, observing how happily those organs were employed as character in extricating the genera of vertebrate animals, assumed the instruments of mastication, far more numerous and varied in insects, for the basis of a new system of entomology, which from the maxillæ being principally employed to characterize the order, may be called the Maxillary System.

The first outline of his system appeared in his "*Systema Entomologiæ*," published in 1775, and the last in his "*Supplement to Entomologia Systematica*," in 1798. The other works he published were the "*Genera Insectorum*," which contained the natural definitions of the species, in 1776; the "*Philosophia Entomologica*," in 1778; the "*Species Insectorum*," in 1782, which appeared in two volumes as a continuation of the "*Systema Entomologica*"; and the "*Mantissa Insectorum*," in 1787, in two volumes, which contained more particularly the corrections and additions which he obtained on his travels to Vienna and St. Petersburg. In his "*Philosophia Entomologica*," drawn up on the plan of the "*Philosophia Botanica*," of Linnæus, he bequeathed to the science a standard work to be studied by every entomologist. His incredible labour in depicting new genera, and describing new species, with which view he travelled into various parts of Europe, and seven times into Britain, have been of infinite service, and have placed the science upon a footing much nearer to that of botany than it had ever before attained.

The principal object of his tour to Vienna was to form an acquaintance with the authors of "*Lepidoptera of the vicinity of Vienna*," the principal of whom was Schiffermüller, whom the Emperor Joseph had appointed director of the Northern Institute at Lenz. This Vienna Catalogue, or W.V. as it is usually called, was published in 1775, by Denis and Schiffermüller, two officers of the Austrian army.

Fabricius died in 1810, at the age of 63. Linnæus is reported thus to have spoken of him: "When Fabricius asks me concerning an insect, I take off my hat, and I say unto him, be thou my teacher."

Between the first of Fabricius' works which appeared in 1775, and the last which appeared in 1798, were published the works of Forkhausen, in 1788; of Fourcroy, on the "*Entomology of Paris*," in 1785; of Christian Müller, in 1785; of Von Rottenburg, in 1775, &c.

More confusion exists as to the names given between the years 1770 and 1790 than at any other period in the annals of entomological science. Fabricius, following the example of his master, the illustrious Linnæus, attempted to combine in some degree Natural and Civil History, by attaching the names of persons, illustrious in their day, to the butterflies, and considering the matter of a year or two of no importance, adopted the name of *Adonis* given in the Vienna Catalogue of 1776, to that of the senseless name *Bellargus*, given in "*Der Naturforscher*," published in 1775. Likewise he gave preference to that of *Alsus*, W.V., over that of the misleading name of *Minima*, given by Fuessli in 1775. If entomologists of more modern times only bowed to the wisdom and discretion of Fabricius, instead of following

the stern and harsh rule of priority to too great an extent, much confusion would be avoided. And, after all, are the publishers' dates of any vital importance? Is it of any real importance whether a certain name was given in 1775 or 1776? Perhaps the work published in 1776 was really written before that published in 1775, and delayed being given to the world through some error on the part of the publisher.

If we turn to our own country again, we find that the Linnæan Society was instituted in London in 1788, under the direction and presidency of Dr. J. E. Smith. On the death of Charles Linnæus, son of the great Linnæus, in 1783, the whole of the collections of both father and son; the library, consisting of about 2,500 volumes; and the manuscripts and correspondence, were offered to Sir Joseph Banks, as the most liberal and wealthy naturalist in Europe, for the sum of 1,000 guineas. Sir Joseph himself declined the purchase, but recommended it to the consideration of his friend, Dr. Smith. After some negotiation the bargain was concluded, and these inestimable treasures were sent to England in twenty-six large packages.

Two years previously, on the 24th of April, 1786, and thirty-seven following days, was sold by public auction, the museum belonging to and founded by the celebrated Duchess Dowager of Portland.

In 1789, the celebrated Gilbert White published the "Natural History and Antiquities of Selborne; and in the following year was published the "Naturalist's Miscellany," by Dr. Shaw and Fred. T. Nodder.

The next writer is Edward Donovan, who in 1792, began to publish, at London, "The Natural History of British Insects," explaining them in their various states, with the periods of their transformations, their food, economy, as illustrated by coloured figures, designed and executed from living specimens. It was regularly published in monthly numbers, until fourteen volumes of twelve numbers each were completed, when it closed in 1810. This work did much to forward the progress of entomology in Britain, as did that of Lewin, entitled "The Insects of Great Britain, systematically arranged, accurately engraved, and painted from nature, with the natural history of each species, from a close application to the subject, and observations made in different counties of this kingdom; as well as from breeding numbers from the egg, as caterpillar, during the last thirty years. The figures engraved from the subjects themselves by the author, William Lewin, Fellow of the Linnæan Society, and printed under his immediate direction." Vol. I., London, 1795.

This volume contains all the butterflies known in the British Isles, and is a valuable publication. No others were published owing to the death of the author. The species contained in the work are 62 in number, viz:—

Antiopa or Camberwell Beauty, *Polychloros* or Large Tortoise-shell, *Urticæ* or Small Tortoise-shell, *Io* or Peacock, *C-album* or Comma, *Atalanta* or Red Admiral, *Camilla* or White Admiral (more properly *Sibylla*), *Cardui* or Painted Lady, *Paphia* or Silver-washed Fritillary, *Adippe* or High Brown Fritillary, *Aglaia* or Silver-spotted Fritillary, *Lathonia* or Queen of Spain Fritillary, *Euphrosyne* or Light Pearl-bordered Fritillary, *Euphrasia* (more properly *Selene*) or Dark Pearl-bordered Fritillary, *Cinxia* or Glanville Fritillary, *Dictynna* (more properly *Athalia*) or Heath Fritillary, *Artemis* or Marsh Fritillary, *Lucina* or Duke of Burgundy, *Iris* or Purple Emperor, *Semele* or Great Argus or Black-eyed Marble, *Janira* or Meadow Brown, *Ægeria* or Speckled Wood, *Hyperantus* or Ringlet, *Megæra* or Wall, *Tithonus* or Hedge Brown, *Pamphilus* or Small Gate-keeper, *Hero* (more properly *Davus*) or Manchester Argus, *Galathea* or Marbled White, *Cratægi* or Black-veined White, *Brassicæ* or Large Garden White, *Rapæ* or Small Garden White, *Napi* or Green-veined White, *Daphidice* or Bath White, *Sinapis* or Wood White, *Cardamines* or Orange-tip, *Rhamni* or Brimstone, *Electra* (more properly *Edusa*) or Clouded Yellow, *Hyale* or Pale Clouded Yellow, *Machaon* or Swallow-tail, *Podalirus* or Scarce Swallow-tail (a doubtful British species), *Corydon* or Chalk-hill Blue, *Argiolus* or Azure Blue, *Arion* or Large Blue, *Hyacinthus* or *Dorylas*, Glossy or Dartford Blue (a doubtful British species), *Adonis* or Clifden Blue, *Cimon* or *Acis*, Dark or Mazarine Blue, *Icarus* or Common Blue, *Argus* or *Ægon* or Silver-studded Blue, *Alsus* or Small Blue, *Idas* or *Medon* or Brown Argus, *Artaxerxes* or Brown White Spot (the Scotch variety of last), *Hippothoe* or *Dispar* or Large Copper, *Virgaureæ* or Scarce Copper (a doubtful British species), *Phlæas* or Small Copper, *Betulæ* or Brown Hairstreak, *Quercus* or Purple Hairstreak, *Pruni* (more properly *W-album*) or Dark Hairstreak, *Rubi* or Green Hairstreak, *Comma* or Pearl Skipper, *Tages* or Brown Skipper, *Thaumas* or *Linea* or Small Skipper, *Sylvanus* or Large Skipper, *Malvæ* or Spotted Skipper (more properly *Alveolus*), and *Fritillum*, a variety of the last.

This brings to a close the eighteenth century, the latter half of which was excessively productive of entomological literature. It will be observed that Lewin, in 1795 was only acquainted with twelve species unknown to Petiver in 1717, and of these, three are not now admitted as British. Since the publication of Lewin's work, only eight species of butterflies have been added to the British list, viz., *Paniscus* in 1798, *Blandina* in 1804, *Cassiope* in 1809, *Pruni* in 1828, *Actæon* in 1832, *Bæticus* in 1859, *Plexippus* in 1876, and *Argiades* in 1885.

The first entomological work of the present century is an English translation of the "Systema Naturæ" of Linnæus, by Wm. Turton, M.D., F.L.S.,

published in the year 1800; and in 1803 appeared the first volume of the "Lepidoptera Britannicæ," by Alexander Hadrian Haworth, founder of the Aurelian, afterwards Entomological Society of London. He includes all the butterflies mentioned by Lewin, and in addition, *Helice*, the white female variety of *Edusa*; *Eurypome*, not a British species at all; *Polydama* and *Typhon*, varieties of *Davus*; *Charlotta*, a variety of *Aglaia*; *Eos*, a variety of *Athalia*; *Chryseis*, a doubtful British species; *Paniscus*; *Tessellata*, a variety of *Athalia*; *Hampstediensis*, not a British species, but an inhabitant of Australia; and *Apollo*, as a doubtful native, in the preface.

The "Lepidoptera Britannica" was preceded in 1801, by the "*Prodromus Lepidopterorum Britannicæum*," of the same author, but which was anonymously submitted to the inspection of the entomological world. It was a mere catalogue of names of lepidoptera, with their times and places of appearance in the winged state. On the other hand, the "Lepidoptera Britannica" was the first work on British lepidoptera published upon a general and scientific scale.

In 1802, was likewise published at Edinburgh, the second volume of Stewart's "Elements of Natural History," containing the entomological portion, which is more extensive concerning British insects than any previous work, but no less than twenty very doubtful ones are included.

In 1806, was published "The British Miscellany," by J. Sowerby, F.L.S. The butterflies figured in it are *Charlotta*, *Blandina*, *Ligea*, and *Chryseis*.

In 1812, was published the first volume of the "Transactions of the Entomological Society of London"; and in 1819, Samouelle's "Entomologist's Compendium." Two more important works shortly after appeared, namely, "Illustrations of British Entomology," by Jas. F. Stephens, F.L.S., and "British Entomology," by John Curtis, F.L.S. In the latter are figures of the following butterflies, most admirably executed, viz.:—*Podalirius*, *Cratægi*, *Rhamni*, *Hyale*, *Daphidice*, *Hero* (not a British species), *Arcanius* (another foreigner), *Antiopa*, *Iris*, *Camilla* (more properly *Sibylla*), *Aglaia* (a very dark variety), *Selene*, *Lucina*, *Pruni*, *Dispar*, and *Actæon*. The former author, whilst considering it absurd to consider *Podalirius* any longer to be a British species, yet figures and admits *Colias Philodice*, a native of America.

The other most useful works of the present century are, viz.:—"Introduction to Entomology," by Messrs. Kirby and Spence; "An Introduction to the Modern Classification of Insects," by J. O. Westwood, Professor of Zoology to the University of Oxford, and the greatest of British entomologists; Miss Jermyn's "Entomologist's Vade Mecum"; "British Butterflies," by Messrs. Humphreys and Westwood, in 1841; Stainton's "Manual,"

in 1857; Rev. F. O. Morris's "British Butterflies, in 1853; and Newman's "British Butterflies," in 1871. Besides these much valuable information may be gathered from Loudon's "Magazine of Natural History," commenced in 1829; the "Zoologist" commenced in 1843; the "Entomologist" in 1840; the "Entomological Magazine" in 1833; the "Entomologist's Monthly Magazine" in 1864; the "Entomologist's Annual" commenced in 1855 and concluded in 1871; the "Young Naturalist," commenced in 1879; and various other works and periodicals, which it is needless to mention.

List of the British Butterflies, with the year in which they were first captured or made known as British, and the name of the first captor and of the author and publication in which they are first brought forward as British.

1667.	<i>Brassicæ.</i>	Merrett's Pinax.
1667.	<i>Cratægi.</i>	Merrett's Pinax.
1667.	<i>Rapæ.</i>	Merrett's Pinax.
1667.	<i>Napi.</i>	Merrett's Pinax.
1667.	<i>Sinapis.</i>	Merrett's Pinax.
1667.	<i>Rhamni.</i>	Merrett's Pinax.
1667.	<i>Galathea.</i>	Merrett's Pinax.
1667.	<i>Megæra.</i>	Merrett's Pinax.
1667.	<i>Ægeria.</i>	Merrett's Pinax.
1667.	<i>Hyperanthus.</i>	Merrett's Pinax.
1667.	<i>Janira.</i>	Merrett's Pinax.
1667.	<i>Tithonus.</i>	Merrett's Pinax.
1667.	<i>Pamphilus.</i>	Merrett's Pinax.
1667.	<i>C-album.</i>	Merrett's Pinax.
1667.	<i>Urticæ.</i>	Merrett's Pinax.
1667.	<i>Selene.</i>	Merrett's Pinax.
1667.	<i>Rubi.</i>	Merrett's Pinax.
1667.	<i>Chryseis.</i>	Merrett's Pinax.
1667.	<i>Icarus.</i>	Merrett's Pinax.
1667.	<i>Tages.</i>	Merrett's Pinax.
1667.	<i>Comma.</i>	Merrett's Pinax.
1692.	<i>Quercus.</i>	See Ray's Historia Insectorum.
1695.	<i>Iris.</i>	By Courtman. See Ray's Historia Insectorum.
1695.	<i>Sibylla.</i>	By Morton. See Ray's Historia Insectorum.
1695.	<i>Polychloros.</i>	See Ray's Historia Insectorum.

1697.	<i>Semele.</i>	See Ray's <i>Historia Insectorum.</i>
1710.	<i>Machaon.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Podalirius.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Edusa.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Cardamines.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Daphidice.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Paphia.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Aglaia.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Euphrosyne.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Lathonia.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Athalia.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Cinxia.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Artemis.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Lucina.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Cardui.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Io.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Alalanta.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Phlæas.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Betulæ.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Corydon.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Ægon.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Acis.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Argiolus.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Linea.</i>	Ray's <i>Historia Insectorum.</i>
1710.	<i>Alveolus.</i>	Ray's <i>Historia Insectorum.</i>
1717.	<i>Adippe.</i>	Petiver's <i>Papilionum Britanniae.</i>
1717.	<i>Agestis.</i>	Petiver's <i>Papilionum Britanniae.</i>
1717.	<i>Sylvanus.</i>	Petiver's <i>Papilionum Britanniae.</i>
1748.	<i>Antiopa.</i>	See Harris' <i>Aurelian.</i>
1775.	<i>Hyale.</i>	Harris' <i>Aurelian's Pocket Companion.</i>
1775.	<i>W-album.</i>	Harris' <i>Aurelian's Pocket Companion.</i>
1775.	<i>Adonis.</i>	Harris' <i>Aurelian's Pocket Companion.</i>
1795.	<i>Arion.</i>	Lewin's <i>Insects of Great Britain.</i>
1795.	<i>Dorylas.</i>	Lewin's <i>Insects of Great Britain.</i>
1795.	<i>Artaxerxes.</i>	Lewin's <i>Insects of Great Britain.</i>
1795.	<i>Alsus.</i>	Lewin's <i>Insects of Great Britain.</i>
1795.	<i>Dispar.</i>	Lewin's <i>Insects of Great Britain.</i>
1798.	<i>Paniscus.</i>	By Dr. Abbott. See Linn. <i>Trans.</i> , Vol. V.
1804.	<i>Medea.</i>	By Dr. Walker. See Don. <i>Nat. Hist.</i> Vol. XII.
1809.	<i>Epiphron.</i>	By T. S. Stothard, R.A. See <i>Ent. Trans.</i> Vol. I.

1828.	<i>Pruni.</i>	By W. Seaman. See Curt. Brit. Ent.
1832.	<i>Actæon.</i>	By J. C. Dale, F.L.S. See Curt. Brit. Ent.
1859.	<i>Bæticus.</i>	By W. McArthur. See Entomologist.
1876.	<i>Plexippus.</i>	By J. T. Llewelyn. See Entomologist.
1885.	<i>Argiades.</i>	By Rev. O. P. Cambridge. See Entomologist.

Various kinds of butterflies are remarkable for their periodical or irregular appearance. Of these, the species of *Colias* or Clouded Yellows, the Painted Lady, and the Camberwell Beauty are pre-eminent; thus the last-named will not be seen for eight, ten, or more years, according to Mr. Haworth, and then will appear as plentifully as before, indeed in 1789 it occurred in such profusion as to obtain the name of the "Grand Surprise" from the Aurelians of that time. In 1872, it also occurred all over the country. 1877 will be remembered as the great "Clouded Yellow year," and in 1879 the Painted Lady absolutely swarmed. In the autumn of 1872, the Bath White and the Queen of Spain were also taken freely on the Kentish coast.

None who live in the country can be ignorant of their existence. From the first sunny days in February or March, when the Brimstone emerges from its winter's retreat, to chilly November when we see the Red Admiral feasting on the ivy bloom, they are always before us. In gardens we find Brimstones and White, an occasional Meadow Brown, Peacocks, and Tortoise-shells, Painted Ladies and Red Admirals, Blues and Small Coppers. In lanes we find, in addition to these, several species of Browns, and perhaps the Fritillaries, Hair-streaks, and Skippers. The Purple Emperor, White Admiral, and most of the Fritillaries require to be sought for in woods; and the Marble White, some of the Blues, and one of the Skippers (*Hesperia comma*) on chalk downs. The Swallow-tail, although gone from most parts of England, is still to be found in the fens of the Eastern Counties. The Clouded Yellows frequent meadow, lucerne, and clover fields on the South Coast in autumn; and the Lulworth Skipper occurs on the coasts of Dorset and Devonshire. If we visit the North of England and Scotland, we shall find the two species of *Erebia* and *Cænonympha typhon* on the mountains and moors; and the latter country enjoys almost the exclusive privilege of supplying *Lycæna Artaxerxes* to our collections; the variety occurring occasionally with the type on the Durham coast also. Heaths are frequented by *Satyrus Semele* and *Lycæna Ægon*. Although some of our butterflies are exceedingly local, only six are very rare with us, viz.:—*Pieris Daphidice* or Bath White, *Argynnis Lathonia* or Queen of Spain, *Chrysophanus Dispar* or Large Copper (an extinct species), *Polyommatus Acis* or Mazarine Blue, *P. Argiades* and *P. Bæticus*.

The distribution of Butterflies in the British Isles, as known at the present time may be stated thus :—

Papilio machaon. England east, in the fens.

Aporia cratægi. England south.

Pieris brassicæ. England, Ireland, Scotland, Hebrides, Orkneys, Channel Islands.

P. rapæ. England, Ireland, Scotland, Hebrides, Orkneys, Channel Islands.

P. napi. England, Ireland, Scotland, Channel Islands.

P. daplidice. England south east, Channel Islands.

Anthocaris cardamines. England, Ireland, Scotland, Channel Islands.

Leucophasia sinapis. England, Ireland, Channel Islands.

Gonopteryx rhamni. England, Ireland south, Channel Islands.

Colias edusa. England, Ireland, Scotland, Orkneys, Channel Islands ; erratic.

C. hyale. England, Ireland, Channel Islands ; erratic.

Thecla betulæ. England, Ireland.

T. quercus. England, Ireland, Scotland, Channel Islands.

T. w-album. England, Channel Islands.

T. pruni. England east.

T. rubi. England, Ireland, Scotland, Channel Islands.

Chrysophanus dispar. England east, in the Fens. Extinct since 1850.

C. phlæas. England, Ireland, Scotland, Channel Islands.

Polyommatus bœticus. England south, Channel Islands ; erratic.

P. argiades. England south, in Dorsetshire on heaths.

P. argiolus. England, Ireland, Channel Islands.

- P. arion.* England, southern and midland counties.
P. acis. England, south ; probably extinct.
P. alsus. England, Ireland, Scotland.
P. corydon. England, on the chalk and limestone.
P. adonis. England south, on the chalk and limestone.
P. icarus. England, Ireland, Scotland, Hebrides,
 Orkneys, Channel Islands.
P. agestis. England, Scotland, Channel Islands.
P. Ægon. England, Ireland, Scotland, Channel
 Islands.
Nemeobius lucina. England, Scotland south-west.
Melanargia galathea. England, on the chalk and
 limestone.
Hipparchia ægeria. England, Ireland, Scotland,
 Channel Islands.
H. megæra. England, Ireland, Scotland, Channel
 Islands.
H. semele. England, Ireland, Scotland, Channel
 Islands.
H. tithonus. England, Ireland, Scotland, Channel
 Islands.
H. janira. England, Ireland, Scotland, Hebrides,
 Channel Islands.
H. hyperanthus. England, Ireland, Scotland, Channel
 Islands ; in woods.
Cœnonympha typhon. England north, Ireland, Scot-
 land, Hebrides, Orkneys, Shetland ; on moors.
C. pamphilus. England, Ireland, Scotland, Hebrides,
 St. Kilda, Channel Islands.
Erebia medea. England north, Scotland south and
 central ; woods, moors, and mountains.
E. epiphron. England north-west, Ireland north-west,
 Scotland central ; on high mountains.

- Danaïs plexippus*. England south-west ; wanderer.
Apatura iris. England, in woods.
Limenitis sibylla. England, in woods.
Vanessa cardui. England, Ireland, Scotland, Orkneys, Shetlands, Hebrides, Channel Islands ; erratic.
V. atalanta. England, Ireland, Scotland, Orkneys, Shetlands, Hebrides, Channel Islands.
V. antiopa. England, Ireland, Scotland, Channel Islands ; erratic.
V. io. England, Ireland, Scotland, Channel Islands.
V. urticæ. England, Ireland, Scotland, Channel Islands.
V. polychloros. England, Channel Islands.
V. c-album. England, Channel Islands.
Argynnis paphia. England, Ireland, Scotland.
A. adippe. England, in woods.
A. aglaia. England, Ireland, Scotland, Channel Islands.
A. lathonia. England east and south, Ireland south-west, Channel Islands.
A. euphrosyne. England, Scotland ; in woods.
A. selene. England, Ireland, Scotland.
Melitæa cinxia. England south-west, Channel Islands.
M. athalia. England south, Ireland south.
M. artemis. England, Ireland, Scotland.
Cyclopides paniscus. England.
Hesperia comma. England, on the chalk.
H. sylvanus. England, Ireland, Scotland, Channel Islands.
H. linea. England, Ireland, Channel Islands.
H. actæon. England, south-west coast.
Syricthus alveolus. England, Ireland, Scotland south-

west, Channel Islands.

Nisoniades tages. England, Ireland, Scotland, Channel Islands.

Of the above 67 species, the whole have been taken in England; 40 in Ireland; 36 in Scotland; 8 in the outer Hebrides; 7 in the Orkney Isles; 3 in the Shetlands; 39 in the Channel Islands; and only one solitary butterfly has been taken in the small and far-away Isle of St. Kilda.

In Central Europe, or Germany, 186 species of Butterflies have been observed; the remaining 140 European species being peculiar to Spain, Italy, Greece, Russia, or Lapland.

Of the German species, just 100 occur in Belgium, but only 66 in England, although we possess one species (*Erebia epiphron*) which does not occur in Belgium.

One of our species appears to have a very restricted distribution. This is the now extinct *Chrysophanus dispar*, which seems to have been confined to England, though its variety *rutilus* inhabits Central and Eastern Europe and North and West Africa.

Next we have *corydon*, *incina*, *sibylla*, *typhon*, *epiphron*, and *galathea*, all of which seem to be confined to Europe proper, and in most cases to Central Europe. None of them, except *typhon*, range very far north, though probably one or two reach Asia Minor.

The next lot occur in Europe and in North and West Asia, and include *sinapis*, *cratagi*, *betulae*, *quercus*, *pruni*, *w-album*, *arion*, *acis*, *alsus*, *iris*, *medea*, *semele*, *hyperanthus*, *megara*, *polychloros*, *adippe*, *cinxia*, *paniscus*, and *tages*.

The 41 species which remain have a wider range.

Of these at least seven, viz., *machaon*, *hyale*, *edusa*, *alexis*, *agestis*, *phlaeas*, and *lathonia*, reach the Himalayas; while two others, *brassicæ* and *argiolus* have representative forms there. Three at least reach Japan, namely, *edusa*, *hyale*, and *io*.

A rather large number occur on the south side of the Mediterranean, and are recorded for North Africa, viz., *machaon*, *daphnidice*, *rapæ*, *brassicæ*, *rhamni*, *edusa*, *hyale*, *argiolus*, *adonis*, *alexis*, *argiades*, *agestis*, *bætica*, *rubi*, *phlaeas*, *atalanta*, *antiopa*, *lathonia*, *artemis*, *janira*, *ageria*, *pamphilus*, *linea*, and *actæon*. One (*hyale*) occurs in South Africa, where *edusa* is represented by the closely-allied species *electra*.

In North America, but chiefly on the western side of that continent several species are said to have been found. Of these *machaon*, *antiopa*, *atalanta*, and *phlæas* seem certainly to occur; while *hyale*, *edusa*, *rhamni comma*, *sylvanus*, and *linea* have all been reported, and if they do not actually occur they are represented by species very closely allied, as also are *c-album*, *aglaia*, and *argiolus*. A supposed variety of *rubi* has been found in California, and *rapæ* has been introduced into Canada, &c., in late years, and seems already to have developed a climatic race.

Finally, *cardui* appears to occur nearly all over the world, except in South America.

Of the species mentioned above, 21 have been found within or near the Arctic Circle, namely, *machaon*, *cardamines*, *napi*, *alexis*, *acis*, *agestis*, *agon*, *phlæis*, *rubi*, *antiopa*, *urticæ*, *athalia*, *selene*, *euphrosyne*, *aglaia*, *lathonia*, *tithonus*, *pamphilus*, *typhon*, *aloeolus*, and *comma*.

Five of our butterflies hibernate—that is, pass the winter—in the egg state, viz., *quercus*, *w-album*, *pruni*, *betulæ*, and *agon*.

Thirty-nine hibernate in the larva or caterpillar state—*cratægi*, *corydon*, *adonis*, *alexis*, *agestis*, *argiades*, *alsus*, *acis*, *arion*, *dispar*, *phlæas*, *galathea*, *semele*, *janira*, *tithonus*, *hyperanthus*, *ageria*, *megæra*, *epiphron*, *medea*, *davus*, *pamphilus*, *iris*, *sibylla*, *paphia*, *adippe*, *aglaia*, *lathonia*, *euphrosyne*, *selene*, *artemis*, *cinxia*, *athalia*, *linea*, *actæon*, *sylvanus*, *comma*, *paniscus* and *tages*. The first named differs from the rest in being gregarious in the larva state, and in passing the winter under cover of a web.

Twelve hibernate in the pupa, or chrysalis state—*machaon*, *edusa*, *hyale*, *brassicæ*, *rapæ*, *napi*, *daphidice*, *cardamines*, *sinapis*, *lucina*, and *alveolus*.

Eight hibernate in the imago or perfect state—*rhamni*, *io*, *antiopa*, *polychloros*, *urticæ*, *c-album*, *atalanta*, and *cardui*. Many of these creep into hollow trees, others hide in houses or outhouses, and imagines of *urticæ* have been found in the crevices of chalk nearly a foot below the surface.

All our British butterflies (with the exception of the Wood White and the Speckled Wood) are true children of the sun. Their flight is varied, and the skilful collector knows at a distance the flight of different genera, and even occasionally that of different species; thus, my father could distinguish *acis* on the wing from the common *icarus*. The power of flight depends considerably on the robustness of the

thorax and the strength of the wing veins; thus some of the *nymphalidæ* are more powerful fliers than the great Swallow Tails; such, for instance, is the case with the Painted Lady. Others—as the whites and browns—fly with an undulating motion, whilst the Purple Emperor sails over the topmost branches of the oak. Others—as the Skippers—have a short, quick jerking kind of flight. The sexes, though generally resembling each other, occasionally offer various distinctions, especially in colour, the males in such cases being almost invariably the most gaily coloured. This is especially the case with the Purple Emperor, the Blues, and the Coppers. In these the upper surface alone offers this distinction; the Orange tip, however, has tips to the forewings coloured orange on the underside as well as on the upper. In the purple hair-streak the individuals which have a bright purple patch on the upper surface of the wings are the females, as is also the case with the Brown Hair-streak, except that in this species the patch is a dull orange. Some of the Fritillaries have black longitudinal ribs on the forewings of the males, and Haworth describes the female of the Red Admiral as differing from the male by possessing a minute white dot on the central red fascia of the forewings. In the genus *Colias*, or Clouded Yellows, the males exhibit a character generally overlooked by entomologists. It is a kind of glandular sac placed upon the anterior edge of the hind wings near the base. It is large in *edusa*, and entirely wanting in *hyale*. *Edusa* has a whitish variety of the female, on which the name of *helice* has been bestowed; and *paphia* has a dark greenish one, which is called *vallezina*. The females of *janira*, *corydon*, and *adonis*, occasionally, but very rarely, appear with the coloration of the male.

The variations in the colours and markings of the different species are very numerous, still some general principles are evident. Thus, the *Pieridæ* are almost uniformly white; *Colias* and its allies, yellow; the Fritillaries, rich fulvous with black spots, and silvery ones on the under side; *Satyrus* and its allies are of various shades of brown with eye-like spots; the species of *Chrysophanus* are of a copper colour, and of *Polyommatus* blue, with small eye-like spots on the under surface; whilst those of *Thecla* have hair-like streaks on the under sides. Variations in colours may also be seen in individuals of the same species; thus, you may get a black variety of the White Admiral, a brown variety of a Blue and White, or bleached variety of the Meadow Brown.

The eggs of butterflies differ very remarkably both in size and shape. In some the surface is most beautifully ornamented as with carved work, but a thousand times more delicate and fine than any carving that human hands could execute. Some are exquisitely fluted, others are ribbed, the ribs being from ten to thirty in number, and these are connected by a great number of excessively minute transverse raised lines; some are entirely covered with a net-work of raised lines, others have rows of minute warts, forty or fifty in number, all of which converge to a point at the top of the egg; others are perfectly smooth and without markings of any kind; and some few of them have a lid at the top, which the young caterpillar gently lifts off when he makes his first appearance in the world.

One of the most curious and striking facts, is the extreme difference in the eggs of some species which in the perfect state closely resemble each other. Thus the egg of the Large Tortoise-Shell is pear-shaped and smooth, while that of the Small Tortoise-shell is oblong, with eight very conspicuous ribs. The characters of each are, however so constant in each species of butterfly, that any one who has paid attention to the subject can immediately say to what butterfly any particular egg belongs. Thus the egg of the Peacock is like a polygonal jar, the egg of the Meadow brown is globular, that of the Large white reminds us of some antique vessel, and that of the Queen of Spain, simulates curious wicker-work baskets.

Our British Rhopalocera or butterflies are divisable into three primary groups or tribes, and into eight families, thus:—

Tribe I. *SUCCINTA*. Pupa attached by the tail and by a belt of silk round the body, head pointed upwards.

Family I. *Papilionidæ*. Larva elongate, smooth or pubescent, Imago with six feet in both sexes.

Family II. *Lycænidæ*. Larva short and thickset, in shape something like a woodlouse. Imago with six feet in both sexes.

Family III. *Erycinidæ*. Larva short and thickset, in shape something like a woodlouse. Imago with four feet in the male and six feet in the female.

Tribe II. *PENDULÆ*. Pupa attached only by the tail, and hangs with head downwards. Imago with four feet in both sexes.

Family IV. *Satyridæ*. Larva with a bifid tail, like a fish.

Family V. *Danaidæ*. Larva with from one to five pair of fleshy prolongations.

Family VI. Apaturidæ. Larva like a slug, with a pair of horns on its head.

Family VII. Nymphalidæ. Larva covered more or less with spines.

Tribe III. INVOLUTÆ, Pupa enclosed in a more or less transparent cocoon. Imago with six feet in both sexes.

Family VIII. Hesperidæ. Larva elongate, with a large head.

In the Satyridæ, Danaidæ, Apaturidæ, and Nymphalidæ, the perfect insects or imagines have the first pair of legs in a very rudimentary state, and quite unfitted for walking, so that in ordinary language they have only four legs. In the Erycinidæ, the males have only four useful legs, though the females have six. The other three families have always six serviceable legs in both sexes.

These families are also readily distinguishable in the earlier states; for the larva, or caterpillar, as they are more commonly called, of the Papilionidæ are elongate and of the ordinary form; the larvæ of the Lycænidæ and of the Erycinidæ are broad and short, and are termed onisciform, that is shaped like a woodlouse; the larvæ of the Satyridæ are elongate and have two short projecting tails, and are termed pisciform, that is shaped like a fish; the larvæ of the Apaturidæ have two projecting horns on the head and are termed Limaciform, that is shaped like a slug; the larvæ of the Nymphalidæ are armed with spines or bristly hairs; and those of the Hesperidæ have large heads.

The pupa or chrysalides of the Papilionidæ, Lycænidæ and Erycinidæ, are termed girted, that is, the caterpillars when changing to the chrysalis state, attach themselves to a wall, bit of stick, or grass stem, as the case may be, by their tails and with a girdle of silk round the middle of the body, with the head pointed upwards; whilst those of the Satyridæ, Danaidæ, Apaturidæ, and Nymphalidæ, are simply attached by the tail with the head pointed towards the ground. On the other hand the caterpillars of the Hesperidæ when entering the pupa or chrysalis state, spin a more or less transparent cocoon, thus resembling the habits of some moths more than any of the other butterflies, if we except *Hipparchia semele*, and *Doritis apollo*.

The caterpillars of butterflies feed exclusively on the leaves and flowers of plants, and plants of the same natural family are especially liable to the attacks of allied species of caterpillars, the affinities of one confirming those of the other. Thus those of the genus *Pieris*,

or white butterflies feed on the Cruciferæ, those of *Colias* in the herbaceous Leguminosæ, of *Argynnis* on Violets, of *Thecla* on trees and shrubs, of *Melitæa* on plantain and allied plants, of *Satyrus* and *Hesperia* on various species of grass. Two allied species of *Vanessa*, *urticæ* and *polychloros*, feed respectively on the nettle and the elm belonging two allied genera of plants.

The number of butterflies which have been described from various parts of the earth is very great, equalling that of the birds, both being over 7,700, but by far the greater number of butterflies come from the East Indies, and tropical America. A single genus, *Papilio*, contains over 500 species, but only 4 of these occur in Europe.

Some of these insects have afforded materials to several entomologists for the production of elaborate memoirs upon their anatomy. Swammerdam especially, (in his *History of Insects*), investigates that of the Large Cabbage-white and the Small Tortoise-shell. Herrald has also studied the former species, tracing the variations which its internal organs undergo during the process of transformation.

That weather has an immense influence upon insect life cannot be denied, especially with regard to butterflies. Thus we find plenty of them sporting about in all directions in fine hot weather, and enjoying the beneficial warmth of the genial sunshine. On the other hand in cold wet summers we come across very few. There are of course notable exceptions, for instance the remarkable swarms of *Vanessa cardui* during the wet, sunless, and ungenial season of 1879. Another species which was also abundant that year was *Hipparchia ægeria*. This insect is remarkably fond of shade and moisture, the wet climate of Dunegan in the Isle of Skye seeming to be well adapted to its requirements. On the other hand a wet year is not necessary for an abundance of *Cardui*, as it was excessively common in 1826 and 1884 years which had very fine summers and autumns.

The wettest years of the present century are :—1815, 1836, 1848, 1852, 1860, 1872, 1879, and 1888. The wettest seven consecutive years are those from 1879 to 1881, years bad alike to the farmer and to the entomologist. No others are known. There are however two instances of five consecutive wet years—1772 to 1776 and 1827 to 1831. 1772 to 1776 had a mean excess of 17 per cent, 1827 to 1831 of 9 per cent, 1875 to 1881 of 13½ per cent. The driest years of the present century are :—1800, 1808, 1826, 1834, 1844, 1854, 1855, 1858, 1864, 1868, 1870, 1874, 1884, and 1887.

In 1800 no rain fell for 74 days till the 19th of August, when a glorious rain came down. This record was however beaten by one of a much earlier date, that of the year 1102, which was so hot and dry that forests, and fields of standing corn took fire. The year 1826 is recorded as being the hottest year for 63 years, and that, as in 1768, the hot summer was followed by an unusually mild and open winter and spring. 1858 also was a year of extreme heat, every month with the exception of October and November being above the average. On 7 days the thermometer stood above 90° December was also a remarkable month, being one of the warmest, wettest, and most stormy on record, with thunder storms almost daily. 1870 was another fine year, but not so hot as 1868. 1887 had a remarkably fine summer, lasting from the early part of June to the 27th of August. The remainder of the year was however very wet, as were also the months of April and May.

A remarkable contrast is afforded by the two successive years 1887 and 1888. In the two months of June and July, 1888, there were 507 hours of brilliant sunshine, whilst in June and July, 1887, there were only 227 hours of sunshine at all. The year 1888 is more remarkable for containing the two coldest days on record in July, the 13th and 14th. The mean temperature on the former day was as low as 46·2" and on the latter 48·1", whilst the lowest records in July of any previous years are 47·7" in July 20th, 1836, and 48° in July 8th, 1856. The lowest temperature reached on 13th July, 1888 was 42·8", and the highest 55·7". This unseasonable coldness was due to the frequent and heavy rainfall, and the fact that heavy falls of snow took place in the mountainous regions of Great Britain, and even in some central parts of England. (In 1885 snow fell on 16th May). It will not be difficult to find two days in the month of January of higher temperature than these two in July, 1888.

The most severe winters of the present century are those of 1795-96, 1813-14, 1829-30, 1837-38, 1854-55, 1860-61, 1870-71, and 1880-81. In the winter of 1813-14, the Thames was frozen over so hard that a fire was lighted upon it and an ox roasted. It was frozen over also in the winter of 1795-96, 1829-30, and 1880-81. The coldest March is probably that of 1888. Cold springs with North-easterly winds, and frosts in May, appear to have a more injurious effect upon insect life than severe winters. Such for instance as that of 1861 when the oaks which came out early, had all their leaves blackened and cut off by the

frosts. Winds and gales have also an injurious effect upon insect life, such as the heavy gale of April 29, 1882 which was the strongest since 1830. In that storm the wind was greatly impregnated with salt, which irretrievably injured vegetation of all kinds, and even at Chichester, 9 miles from the sea all the windows of the houses were covered with salt spray. The year 1867 had a very cold and frosty May; there was a very short period between the latest spring, and the earliest autumn frost; the latest spring frost being on 29th May and the earliest frost in autumn being on the 31st August. It is difficult to say what influences the abundance of particular species in certain years, but it appears evident that fine sunny summers are most productive of butterfly life, such as those of 1870 and 1887 for the Blues, and a hot one as 1868 for *Colias hyale*; 1877, the great year for *Colias edusa* had a remarkably fine September. A long continuance of easterly winds in the late summer and autumn of 1872 seems to bring to our shores such rarities of ordinary years, as *Antiopa*, *Lathonia*, and *Daplidice*. On the other hand, weather apparently has very little effect on *Cardui* or *Janira*. However it is very evident that the same season that is favourable for *Antiopa*, is likewise so for *Lathonia* and *Daplidice*, whilst *Cardui* is generally accompanied by *Plusia gamma*, and *Edusa* by *Scopula ferrugalis*.

Another subject worth considering is the disappearance, or increasing scarcity of certain species. Sometimes we have a cold summer with rarely a glimpse of sun, and frequent chilly rains (preceded or followed by a severe winter). In such a season butterflies are seldom seen on the wing, and their chances of pairing and depositing their eggs are few. Diurnal species become torpid on a dull day and a continuance of dull days is fatal to them, and were it not for a wonderful amount of recuperative power, and a few favourable seasons coming together, we should have still fewer butterflies than we have at the present time. But cold weather at the time that the perfect insects should appear is not the only thing they suffer from. Open winters, and mild weather in February and March, tempt hybernating caterpillars from their winter retreat, and after they have begun to feed again, they are much less able to resist the frosts we sometimes get afterwards in the months of April and May, such as we had in 1867, and 1885, in which latter year, snow fell on the 16th of May. The salt storms also of April 29th, 1882 had a most disastrous effect on the insect life of that year, many of the spring caterpillars being

starved to death for want of food. It has often been stated that mild open winters, cold ungenial springs, and rainy and sunless summers are the chief causes of the diminution of the numbers of our butterflies. Facts tend to prove that it is due rather to a conjunction of unusually severe winters, and wet sunless summers. The last specimens of *Machaon*, *Cratægi* and *C-album* taken at Glanvilles Wootton were in the year 1815 and 1816. Let us consider that period. The winter of 1813-14 was so severe that an ox was roasted on the Thames, and the author of the "Journal of a Naturalist" informs us that the summers of 1815, 1816, and 1817 were unceasingly cold and rainy. *C-album* used also to occur abundantly near Hertford previous to 1813, and at Epping about 1817 or 1818. *Machaon* also used to occur in Hampshire, Somersetshire, Gloucestershire, Glamorganshire and Yorkshire previous to 1819. Another species, *Polygonatus acis* became very scarce at that period, but it got common again in 1819 and particularly so in 1825 and also in 1835. Then 1836 had a very wet and ungenial summer in which only one specimen was seen at Glanvilles Wootton, this was followed by a severe winter; after which the records in my father's journal are, a few in 1837, none in 1838, scarce in 1839 and 1840, and a pair in 1841 (being the last ever seen alive in Dorsetshire), which was another very wet year. Another species not observed at Glanvilles Wootton after that year is *Thecla betulae*. Now we arrive at another disastrous period, that of the seven consecutive wet years 1875-1881, including the excessively wet summer of 1879, and the severe winter of 1880-81. Since those years no specimen of *Acis* has been seen in Britain, nor any of *Arion* except a few in 1884. *C-album* also almost disappeared, but increased again in the Welsh and neighbouring counties of England in 1886. *Cratægi* disappeared at that period, the only specimens taken since, being a few in Kent during the fine summer of 1887.

The other two bad epochs, 1827-31, and 1860-63, appear to have done nothing beyond thinning the ranks of various species. For instance my father did not see one single specimen of *Gonepteryx rhamni* during the whole year of 1861, and it was also scarce for two or three years afterwards, as was also *Phlaeas*.

Other records of the scarcity of particular species are those of *Napi* in 1868, a fine hot summer; of *Atalanla* in 1845; of *Janira* in 1867; and of *Megara* in 1860-63, during which the species disappeared entirely from large districts in the North of England and Scotland, in

some of which it has never re-appeared. Years frequently occur in which *Edusa*, *Hyale*, *Cardui*, *Antiope*, *Lathonia*, and *Daplidice*, are all, or many of them entirely absent.

The most favourable years for the production of insect life have been 1794, 1798-1800, 1808-12, 1818-26, 1830-35, 1842-44, 1855-59, 1868-72, and 1887. Of these 1794, 1826, 1842, and 1870 were particularly good years; indeed 1826 goes by the name of the "Annus Mirabilis" of British Entomologists.

Before departing from this subject it must however be borne in mind that atmospheric changes are not the sole cause of the scarcity or disappearance of butterflies. The drainage of Whittlesea Mere, in 1851, caused the loss of *Chrysophanus dispar*. An increase too of their parasitic enemies among the Hymenoptera, and of the Dipterous family *Tabinidæ* do much towards reducing their numbers. In 1853 and 1854 there was a plague of the caterpillars of *Brassicæ* in Sussex. During the latter season owing to the attentions of *Apanteles glomeratus*, the number of fly-blown caterpillars was incredible, so much so that there was almost a total cessation of the plague in 1855. An increase also in the number of small birds does much towards reducing the number of caterpillars, which form to a great extent their natural food. In fact they may have had more to do with the disappearance of *Cratægi*, than bad seasons.

It has been mooted that melanism is produced by atmospheric conditions. Be this as it may, it is certain that more rain falls in the North of England, where melanism is most frequent, than in the South. On the average there are 350 days on which rain falls in the North and West of England, against 150 days in the South and East. The Sty Head in Cumberland is reckoned to be the wettest place in England, and Cambridge to be the driest. Let us take for instance the rainfall of one year, that of 1881. At the Sty Head it amounted 172·56 in. at Cambridge to 18·41 in. A quantity of rain also falls in the New Forest, and in Ireland. On the other hand, brilliant and light colours hold the sway in the sunny South, and especially on the South Downs, the chalk soil of which absorbs a considerable amount of heat favourable to the development of such species as *Galathea*, *Corydon*, and *Adonis*. Lord Walsingham in an address to the readers of the Yorkshire Naturalists' Union in 1885, argues that northern and mountain species of Lepidoptera are dark, because dark colours absorb heat. Is such the case? I say no! The dry chalk soils of the south absorb a greater

amount of heat than the wet peaty soils of the north, and to that, in conjunction with the fact that there is more rain, and consequently less sunshine in the north, is melanism entirely due. Why even in the South of England darker varieties occur on cold wet lands than on light dry soils, which absorb a greater amount of heat from the rays of the sun. Extreme heat has also a tendency to produce white varieties of the Blues, thus we find a white variety of *Corydon* in Andalusia named *Albicans*. But it may well be asked what effect has heat on the Whites? The tendency is to produce yellow varieties, such as the variety *Nov-angliæ* of *Pieris rapæ*.

Pieris napi affords another instance of the effect of strong sunlight. The spring brood which occurs in May is much darker and more strongly marked than the summer brood which occurs in the month of July, when the days are longer and the sun more powerful. On the Alps a very dark variety of the female named *Bryoniæ* occurs. Besides the fact that the brightest colours which exist in nature are those which we see in insects and birds that are most exposed to the direct rays of the sun; the brightest parts of these birds and insects are those which catch these rays in a greater degree than others; hence the upper sides of butterflies are more highly coloured than the under, a notable instance is found in *Vanessa io*.

The question of nomenclature is a very difficult one to decide. The British Association adopted certain rules for Zoological nomenclature. The most important of these rules was that the 12th Edition of the *Systema Naturæ* of Linnæus should be taken as the starting point. Surely the last and carefully revised edition of so great a work is a safer starting point than an earlier, and admittedly imperfect edition. Mr. Kirby in the supplement to his great Catalogue of Butterflies goes back to the 10th Edition. But if we go back at all, why not go still further? Why not go back to the *Fauna Suevica* published in 1746. Surely if he goes back from 1767 to 1758, he may as well go to 1746. Then we shall have to adopt *Ammiralis* for *Atalanta*, and *Principissa* for *Lathonia*, except indeed we go still further back to 1717 and call the latter *Cantabrigdensi*, Petiver. And surely the descriptions given by Petiver and by Linnæus in his *Fauna Suevica*, are equal in point of merit, if not superior to those of Hufnagle. When Guenée and Doubleday prepared their lists they examined all the authorities for themselves, and rejected for various reasons the works of authors whose figures or descriptions were unsatisfactory. Now-a-days an

Entomologist finds in an old library, an unknown or rejected work, by an obscure writer, with imperfect descriptions. He hastens to make his discovery known to the entomological world, thinking to benefit science by bringing forward prior names to those in general use. But it is injurious to the cause of science to alter a name that is thoroughly established and in general use, and adopted by all the great authors of former days. The question is, as I have said above, a very difficult one, and I have probably erred myself on the subject, but let all those desirous to propose changes of well known names look carefully through the earliest editions of all the old authors, and not fall into such mistakes as Staudinger made in proposing the name of *Sinon* for *Podalirius*, and Kirby in proposing *Croceus* for *Edusa*. Fabricius bestowed the name of *Edusa* upon the clouded yellow in 1776, but Kirby, on the supposition that he did not do so till 1787, gave preference to that of *Croceus*, given by a writer called Fourcroy in an old forgotten work on the Entomology of Paris, published in 1785.

The origin of our British Lepidoptera is a subject of great interest; and in an article on the subject on the "Entomologist's Monthly Magazine," Vol. VIII. p. 45, Dr. Jordan writes: "The British Isles were, without doubt peopled with insects by migration from the continent, and the junction of England to the continent was probably on the eastern side, where the North Sea now rolls; and if the inter drainage of Europe were upon anything like its present plan, the British Channel must have been a vast estuary, leading to the mouth of the Rhine. Whilst England was then part of the continent, there must have been a constant, steady migration from the German side, of all the insects fitted to live in our island."

This is a very ingenious theory I admit, but can it be completely borne out by facts. And again, why should there not have been insects and plants in the British Isles at quite as ancient a date as in Germany, Italy, or even Asia? I am quite willing to admit that some have migrated and that others have been introduced through the agency of man; but that all have done so I cannot. If we take *Erebia epiphron* as an illustration, it is evident that it could not have reached our mountains from the Alps, or the Pyrenees. It is not found in the Scandinavian peninsula, so we cannot suppose it to have come from thence. It is a purely mountain species, and not simply an inhabitant of colder regions; so that a glacial epoch alone would not be sufficient to explain its being amongst us, without there was a

chain of mountains connecting ours with the Alps and Pyrenees. It is also curious why *Vanessa levana* should be absent from our isles. Its caterpillars live gregariously on nettles, and it has a second brood which was described as a distinct species under the name of *Prorsa*. It is a species which can well adapt itself to any climate. There are also many insects common to England and America, but none that are peculiar to the two. However amongst plants there are two, *Eriocaulon septangulare*, which is found in the Island of Skye and the West of England, and *Spiranthes romanzoviana* which grows in the county of Cork, both of which occur in North America also and not elsewhere. I know it has been suggested these have been accidentally introduced, perhaps through the agency of birds. But why should such be the case? If we turn to the butterfly world again, we find that one species—*Colias chrysotheme*—occurs only in a very limited district of Central and South Eastern Europe, but in North America it occurs over a very wide range. Another instance of local distribution may be seen in a moth, *Acidalia degeneraria*, which occurs in the islands of Portland and Corfu. Another moth, *Bankia argentula* occurs in the East of England and the West of Ireland but not in the intervening districts. Which is most likely, that insects and plants migrated from Europe to America, or from America to Europe; from Germany to Britain, or from Britain to Germany? I think neither, but that the same natural causes which produced certain species in Germany, produced the same in Britain; and that the same natural causes which produced *Erebia epiphron* on the Alps, also produced it on the Pyrenees, and on the British mountains; and that their occurrence at these places is not the result of migration. Mr. Bates in "The Naturalist on the River Amazon" tells us he has discovered intermediate forms to exist between the *Heliconia melpomene* of Linnæus, and the *H. thelxiope* of Hubner, and consequently, that we have here in the existence of a complete series of connecting links, an actual example in recent times of transmutation of species. If a tendency to variation were a circumstance of very rare occurrence among the Lepidoptera, the discovery would certainly be very valuable as well as interesting, but we have also cases of climatal changes in our English Lepidoptera. Take for instance *Lycana medon*. In specimens from the South of England the spot on the upper wings is black, when it is the *Agestis* of Huber; in Scotch specimens it is white, and it is then *Artaxerxes* of Fabricius; whilst in the county of

Durham intermediate forms, the *Salmacis* of Stephens are found. In the case of *Chortobius davus*, the depth of colour varies considerably, according as the specimen was from the mountainous districts of the North of England, or the low marshy grounds near Manchester. *Melitæa artemis* too, has its Irish and Scotch forms, in *Hibernica* of Birchall, and *Scotica* of Buchanan White. Now can such cases be taken as a transmutation of species, or is there any such thing in nature as transmutation of species? It is quite certain that climate, soil, and food plant do produce varietal changes, and that hybrids can be produced such as the dog; but I think it is equally certain that if it were so, that such allied species as the rook and the crow would not exist amongst birds, nor *brassicæ* and *rapæ* amongst butterflies. Neither would there be such allied species amongst moths as *Peronea cristana*, with its thirty-five named varieties, and *Peronea hastiana* with its twenty-one. Although both these species are closely allied, and both vary very greatly, yet they have never been known to run, the one into the other, or the one to produce the other.

In bringing this introduction to an end, I must remind my readers that I do not lay much claim to originality, for I have borrowed most largely from Buckler's *Larvæ*, published by the Ray Society, from the *Young Naturalist*, Newman's *Butterflies*, Stainton's *Manual*, and from other authors acknowledged in the body of the work. There is much more that might have been said on the earlier stages of butterflies, but as it may be read up in any work on British Butterflies, I have no wish to enlarge the introduction to undue proportions, and must conclude by thanking the Editor of the *Young Naturalist* for his kindness and courtesy in allowing the History of our British Butterflies to take up so large a portion of his magazine, and for allowing it to be spread over so long a period.

C. W. DALE.

Glanvilles Woolton, Dorset,
20th December, 1889.

ENGLISH INDEX.

Admiral, Red	...	148	Fritillary, Heath	...	199
Admiral, White	...	128	Fritillary, High Brown	...	179
Argus, Brown	...	73	Fritillary, Marsh	...	202
Argus, Durham	...	74	Fritillary, Pearl bordered		
Argus, Scotch	...	74	Dark.....		190
Blue, Azure	...	54	Fritillary, Pearl bordered		
Blue, Bloxworth	...	53	Light		188
Blue, Chalk-hill	...	63	Fritillary, Queen of England		177
Blue, Clifden	...	66	Fritillary, Queen of Spain		182
Blue, Common	...	70	Fritillary, Silverspotted	...	177
Blue, Dartford	...	69	Fritillary, Silver striped		175
Blue, Large	...	59	Fritillary, Silver washed		175
Blue, Longtailed	...	57	Fritillary, Weaver	...	192
Blue, Mazarine	...	56	Grayling	...	90
Blue, Silver Studded	...	79	Hairstreak, Black	...	41
Blue, Small	...	58	Hairstreak, Brown	...	38
Brimstone	...	24	Hairstreak, Dark	...	42
Brown, Hedge	...	96	Hairstreak, Green	...	44
Brown, Meadow	...	93	Hairstreak, Purple	...	40
Camberwell Beauty	...	157	Heath, Large	...	96
Comma	...	169	Heath, Small	...	105
Copper, Large	...	45	Orange-tip	...	21
Copper, Purple-edged	...	48	Painted Lady	...	137
Copper, Small	...	49	Peacock	...	154
Duke of Burgundy	...	81	Ringlet, Manchester	...	102
Emperor, Purple	...	119	Ringlet, Mountain	...	110
Fritillary, Dark Green	...	177	Ringlet, Scotch	...	107
Fritillary, Glanville	...	193	Ringlet, Wood,	...	98
Fritillary, Greasy	...	202	Skipper, Brown	...	226

Skipper, Chequered	...	208	Wall	...	88
Skipper, Dingy	...	226	White, Bath	...	19
Skipper, Grizzled	...	222	White, Black-veined	...	7
Skipper, Large	...	213	White, Green-veined	...	18
Skipper, Lulworth	...	217	White, Large Garden	...	11
Skipper, Silver spotted	...	211	White, Marbled	...	84
Skipper, Spotted	...	222	White, Small Garden	...	15
Skipper, Small	...	215	White, Wood	...	23
Swallow-tail	...	2	Wood Speckled	...	87
Swallow-tail, Scarce	...	6	Yellow, Clouded	...	27
Tortoise shell, Large	...	165	Yellow, Pale Clouded	...	33
Tortoise shell, Small	...	162			

LATIN INDEX.

Acis, Polyommatus	...	56	Ætica, Polyommatus	...	51
Actæon, Hesperia	...	217	Brassicæ, Pieris	...	11
Adippe, Argynnis	...	179	C-album, Vanessa	...	169
Adonis, Polyommatus	...	54	Cardamines, Anthocaris	...	21
Ægon, Polyommatus	...	79	Cardui, Vanessa	...	137
Agæstis, Polyommatus	...	74	Cassiope=Epiphron, Erebia	...	110
Aglaia, Argynnis	...	177	Charlotta, Argynnis	...	177
Alexis,=Agæstis, Polyommatus	...	73	Cinxia, Melitæa	...	193
Alexis,=Icarus, Polyommatus	...	70	Cleodoxa, Argynnis	...	179
Alsus, Polyommatus	...	582	Chryseis, Chrysophanus	...	48
Alveolus, Syricthus	...	229	Comma, Hesperia	...	211
Antiopa, Vanessa	...	157	Corydon, Polyommatus	...	63
Apollo, Doritis	...	117	Cratægi, Aporia	...	7
Argiades, Polyommatus	...	53	Daplidice, Pieris	...	19
Argiolus, Polyommatus	...	54	Davus=Typhon,	...	
Argus=Ægon, Polyommatus	...	79	Cænonympha	101
Arion, Polyommatus	...	59	Dispar, Chrysophanus	...	45
Artaxerxes, Polyommatus	...	74	Edusa, Colias	...	27
Artemis, Melitæa	...	202	Epiphron, Erebia	...	110
Atalanta, Vanessa	...	198	Euphrosyne, Argynnis	...	188
Athalia, Melitæa	...	199	Fritillum, Syricthus	...	222
Aurinia=Artemis, Melitæa	...	202	Galathea, Melanargia	...	84
Betulæ, Thecla	...	38	Helice, Colias	...	28
Blandina=Medea, Erebia	...	107	Hippothoë, Chrysophanus	...	48

— Hyale, Colias ...	38	Philoxenus Cœnonympha	102
— Hyperanthus, Hipparchia	98	Plexippus, Danaus ...	115
— Icarus, Polyommatus ...	70	Podalirius, Papilio ...	6
Idas=Medon, Polyommatus	73	Polychloros, Vanessa ...	165
Io, Vanessa ...	150	Pruni, Thecla ...	42
✕ Iris, Apatura ...	119	Quercus, Thecla ...	40 —
— Janira, Hipparchia ...	93	Rapæ, Pieris ...	15 —
Lathonia, Argynnis ...	182	Rhamni, Gonepteryx ...	24 —
Linea—Thaumas, Hesperia	215	Rothliehii, Cœnonympha	102
— Lucina, Nemeobius ...	81	Rubi, Thecla ...	44 —
Machaon, Papilio ...	2	Salmacis, Polyommatus	74
Malva, Syricthus ...	222	Selene, Argynnis ...	190
— Medea, Erebia ...	170	Semele, Hipparchia ...	90 —
Medon, Polyommatus ...	73	Sibylla, Limenitis ...	128
— Megæra, Hipparchia ...	88	Sinapis, Leucophasia ...	23 —
Melampus=Epiphron, Erebia	110	Sylvanus, Hesperia ...	213
Minima=Alsus, Polyommatus	58	Tages, Nisoniades	226
— Napi, Pieris ...	18	Thaumas—Linea, Hesperia	215
Niobe, Argynnis ...	181	Tithonus, Hipparchia ...	96 —
Palæmon=Paniscus, ...		Typhon—Davus, ...	
Cyclopides	208	Cœnonympha	101 —
— Pamphilus, Cœnonympha	105	Urticæ, Vanessa ...	162
Paniscus, Cyclopides ...	208	Valezina, Argynnis ...	175
Paphia, Argynnis ...	175	W-album, Thecla ...	41 —
— Phlæas, Chrysophanus ...	49		



Bartlepool :—

B. T. ORD, PRINTER AND STATIONER, HIGH STREET.



THE HISTORY

OF OUR

BRITISH BUTTERFLIES.

Family PAPILIONIDÆ.

Who loves not the gay Butterfly, which flits
Before him in the ardent noon, array'd
In crimson, azure, emerald, and gold ;
With more magnificence upon his wing—
The little wing—than ever grac'd the robe
Gorgeous of royalty ; is like the kine
That wander mid the flowers which gem the meadows,
Unconscious of their beauty.

CARRINGTON, *Dartmoor.*

This family belongs to the first division of the butterflies, which is called *Succinta*, because the chrysalides are supported by a silken belt or girdle round the middle of their bodies. See Introduction, page xxxi.

The Papilionidæ are pretty widely distributed over the earth, but are especially abundant in the tropics, where they attain their maximum of size and beauty, and the greatest variety of form and colouring. South America, India, and the Malay Islands are the regions where these fine insects occur in the greatest profusion, and where they actually form a not unimportant feature in the scenery. In the Malay Islands in particular, the giant *Ornithopteræ* may be frequently seen, their large size, stately flight, and gorgeous colouring rendering them even more conspicuous than the generality of birds. One species, *Priamus*, measures no less than eight inches across the wings. The typical genus, *Papilio*, occurs in every country between the arctic and antarctic circles, inclusive of the various islands of the Pacific Ocean. Some of the species are very local, such as *Hospiton*, which only occurs in the

islands of Corsica and Sardinia. The genus *Parnassius* inhabits the mountains of Europe, Asia, and America. *Thais* and *Doritis* belong to what may be termed the Mediterranean fauna, whilst one genus is purely Australian, and three Asiatic.

GENUS I.—PAPILIO.

Auctorum.

PAPILO—The Latin word for Butterfly.

Linnæus included the whole of the butterflies under the generic name *Papilio*, but he only knew 260 species, whereas 7695 are included in Kirby's Catalogue of 1871. The name is now restricted to the Swallow-tails, which having a larger number of species than any other—over 500 species, although only four occur in Europe—and many of them being amongst the largest and most beautiful of the butterflies, still give the name a deserved precedence.

The characters of the genus may be described thus: antennæ rather long, moderately thick; fore-wings long, with arched costa; hind-wings with the margin toothed, and a prolonged tail.

PAPILIO MACHAON.

The Swallow-tailed Butterfly.

MACHAON, Linn., Macha'on. The hero of this name is mentioned by Homer, *Il.*, ii. 731.—The two sons of Æsculapius, skilled in leechcraft, Podalirius and Machaon.

There is no possibility of mistaking this noble insect for any other of our native species, after a glance at its portrait. Its superior size, conjoined with the possession of a pair of long tails on the hind-wings, would at once mark it distinctly, independently of the peculiar markings and colour.

In the colouring of the wings, which expand from three to four inches, a broad simplicity prevails, the general ground tint being a clear creamy yellow, with the veins and marginal bands of the deepest velvety black. The broad bands of black on the front wings are powdered towards the centre with yellow scales, and those on the hind wings with blue scales. The only other colour on this side is a large eye-like spot of red, blue, and black, at the anal angle of the hind wings. The underside is very similar in colouring to the upper, but the black markings are less decided and sharp, and there are several red spots on the hind wings.

Very few varieties have been found in England. There is one in the British Museum, with the ground colour drab, instead of creamy yellow, and

others similar are in a few private collections. There is also a variety with the veins of the hind wings obscured by the ground colour. The red of the eye-spot, at the anal angle, sometimes shows more or less between the veins on the hind-margin. A variety named *Sphyrus*, which occurs in the South of Italy and in Algiers, has more black on the fore wings, and less blue on the hind wings than the type.

The egg, which is laid in June or July, is globular, of good size, and with an apparently smooth surface. When first laid it is of a greenish yellow colour, quickly turning green, and soon after tinged with violet-brown, gradually deepening to purple, and faintly showing the embryo through the shell, which in a day or two turns entirely purplish-black, a process of change similar to that shown by a ripening black currant. The shell next assumes a light pearly transparency, and the dark embryonic caterpillar coiled round within is plainly visible, and in a few hours hatched (Buckler).

The caterpillar, which is a very handsome creature, is found feeding on umbelliferous plants, among which its chief favourites in this country, appear to be the wild carrot (*Daucus carota*), the March milk parsley (*Peucedanum palustre*), and the wood angelica (*Angelica sylvestris*). In colour it is bright green, with black velvet rings, which are spotted with yellow. When young it is much darker. A distinguishing mark of this caterpillar is a reddish coloured forked appendage just behind its head, which, when the creature is alarmed, gives out a strongly scented fluid. Bonnet says: "When I pressed this caterpillar near its anterior part, it darted forth its horn as if it meant to prick me with it, directing it towards my finger, but it withdrew it as soon as I left off pressing it. This horn smelled strongly of fennel, and probably is employed by the insect, by means of its powerful scent, to drive away the flies and ichneumons that attack it. This remarkable V shaped scent organ is situated at the anterior margin at the back of the second segment, close to the head, from which, at first view, it seems to proceed. At the bottom it is simple, but divided towards the middle, like the letter Y, into two forks of a fleshy substance, which it can lengthen, as a snail does its horns, to five times their ordinary extent, or retract them within the stalk so as wholly to conceal them. Sometimes it protrudes one fork, keeping the other retracted; and often withdraws the whole apparatus for hours together under the skin, and its place is only marked by two tawny coloured dots, so that an ordinary spectator would not suspect the existence of such an instrument."

The chrysalis again is very pretty, especially when of its ordinary colour, which is a lively green, shaded in some parts into bright yellow, but there is a frequent variety marked only with various shades of brown and buff. In shape it is angular, with the head slightly bifid.

The first brood of the butterfly appears on the wing the middle of May, according to Lewin. The female lays her eggs in ten or twelve days after, and in a week's time the young caterpillars come forth. In six or seven days they cast their first skin; about the end of June they change their skin for the fifth and last time; and in six or seven days after this they arrive at full growth. They then prepare for their approaching metamorphosis by fixing themselves with a strong belt of silk round the middle of their body, and by the tail. In a day's time the chrysalis is complete, and this superb butterfly comes forth in July following. The caterpillars from the eggs of this brood are bred about the first week in August. After the usual shifting of their skins they become full fed at the end of September, and change to a chrysalis in a short time. In this state they remain through the winter, and the butterflies are produced the following May.

The chrysalides are most interesting objects to keep during the winter months. As the spring advances, the colours of the butterfly begin to appear faintly through their green envelope, and the pattern of the upper wings, which only are visible, becomes at last distinctly perceptible, of course, in miniature. This exit most frequently takes place in early morning, and his wings being tiny things, hang limply from the comparatively ponderous body. Their rapid growth is a matter of marvel, for in about an hour's time they reach their full expanse, and ere many hours are over, they carry him with most enviable celerity through the air.

Abroad, *Machaon* has a wide range, being found in the North and West of Asia, and the Himalayan mountains; in North Africa; and in Western North America. In Europe it is found everywhere, except in the extreme North of the Continent.

In England it seems to have been formerly widely and plentifully distributed, but has never been recorded as an inhabitant of Ireland, Scotland, or the Isle of Man.

This butterfly was figured and described in the first entomological publication extant in Britain, an extensive one in folio, written in the Latin language, and published at London in the year of our Lord 1634, by Thomas Mouffet, entitled "*Insectorum sine minimorum Animalium Theatrum.*"

The next account of it we have is by John Ray, who, in his "*Historia Insectorum,*" published in 1710, mentions that he met with it in Sussex and Essex, and also that he found the caterpillar in Sussex on *Pimpinella saxifraga*.

In 1717, Petifer gives it as being caught about London and divers counties in England, yet rarely. He calls it the "*Royal William,*" and adds "*Its size, beauty, and tail differs it from all others.*"

Benjamin Wilkes writes, "*The first brood appears in May, the second*

towards the end of July. Being in a meadow near Cookham, in Kent, on the 5th day of August, 1748, I observed a female Swallow-tail hovering over certain plants, which I found to be the meadow saxifrage, and examining them carefully, I discovered four eggs just laid by the fly, wherewith I was highly pleased. On the 13th of the same month these eggs produced caterpillars. On the 22nd of September, the caterpillars were full-grown, and fixed themselves in order to change into the chrysalis, which was produced on the 26th of September, it which state it still remains (Jan. 20th, 1749). I fed the caterpillar from its being first hatched, with the green leaves of the common carrot, which it eats plentifully. This fine butterfly may be taken in the meadows and clover fields, about Cookham, near Westram, in Kent, at the times above mentioned. It flies so swiftly that it is vain to follow it, you must, therefore, wait till it settles, and then if you be near, be nimble, and you may catch it without much difficulty."

"In 1776, Moses Harris writes of it: "By some Aurelians it is called the "Royal William," probably as a compliment to His Royal Highness, William Duke of Cumberland, who was popular for his defeat of the rebels in 1745, about the time when this insect appears to have been first particularly noticed. The caterpillar is large and beautiful, smooth and pale green on the back, being striped with black transverse lines, in the same manner as the stripes of the zebra, on which lines are spots of fine crimson. It feeds principally on wild fennel."

In "White's Natural History of Selborne" is a comparative view of the Calendar of Selborne, kept by the Rev. Gilbert White, at Selborne, in Hampshire, and William Marwick, Esq., at Catsfield, near Battle, in Sussex. In it we read: "Swallow-tailed butterfly appears August 2nd.—White; April 20th, June 7th, last seen August 28th—Marwick."

In the end of June, 1798, several larvæ were found by the Rev. Dr. Abbott, at Windlesham, near Bagshot, in Surrey; from these, in the following August, he reared some splendid Swallow-tails.

In his "*Lepidoptera Britannica*," published in 1803, Haworth writes, "I know that *Machaon* breeds near Beverly, in Yorkshire yet, and my brother-in-law, R. Scales, of Walworth, near London, possesses a specimen of it which was taken there about seven years ago.

Between the years 1805 and 1815 several were taken in Dorsetshire; at Hinton Mutel, by the Rev. D. Storey; at Charminster, by Mr. Garland; at Wimborne, Blandford, Hazlebury, and Glanvilles Wootton by my father, the last being on the 17th of August, 1815. In August, 1808, at Glanvilles Wootton, he took twelve specimens on three consecutive days. They used to frequent chalk hills, and smelled very strongly of mint. About the same

time, the Rev. C. Kingsley, L.L.D., met with it in great plenty in Cowslip Meadow, near Lymington, and it was also taken at Redlane, near Bristol, by the Rev. W. Ray, and in Glamorganshire. The Rev. M. Newman also met with it at West Camel, and the Rev. R. Burney, at Rympton, in Somersetshire. Mr. W. Shrimshire took it in plenty at Wisbeach, in Cambridgeshire, and his brother, Dr. F. Shrimshire, at Peterborough, in Northamptonshire, and it was also taken in great plenty by my father, at Whittlesea Mere, in 1814.

Mr. J. F. Stephen's, in his "Illustrations of British Entomology," published in 1828, writes, "*Machaon* is not an uncommon English insect, especially in the fenny counties of Huntingdon and Cambridge, in some parts of which it occurs in the utmost profusion; it has sometimes been captured also close to London, in Epping Forest, at Stepney, and near Peckham; and it was formerly abundant at Westerham, in Kent. Mr. Dale has frequently taken it at Glanvilles Wootton and in other parts of Dorsetshire. It also occurs as far North as Beverley, in Yorkshire, and West as Redlane, near Bristol, in Somersetshire." In her "Butterfly Collector's Vade Mecum," published in 1827, Miss Jermyn only gives the following localities for *Machaon*: "Fenny places, Acle and Horning, Norfolk; Cherry-Hinton, Madingley, Whittlesea, and Grandchester, Cambridgeshire."

In 1841, three specimens of *Machaon* were taken by three different collectors at Haverhill, Suffolk.

In 1856, George Austin writes in the "Entomologists' Weekly Intelligencer," "I have been accustomed to find the larvæ of *Machaon* year after year in the osier beds, behind Beaufroy's distillery in Battersea fields, but never once detected it in the winged state."

In 1871, Newman, in his "British Butterflies," writes: "I have repeatedly found the caterpillar feeding on rue in a garden, on Tottenham Green; this was probably fifty years ago. It can now only be sought for, with any prospect of success, in the counties of Cambridgeshire, Huntingdonshire, Norfolk, and perhaps Suffolk."

PAPILIO PODALIRIUS.

Scarce Swallow-tailed Butterfly.

PODALIRIUS, Linn. Podalirius, brother to Machaon.

The wings are pale yellow, with black transverse bands, the intermediate ones on the fore wings shorter; hind wings with a black border marked with several blue crescents. They have also a long tail, and the eye-like spot at the anal angle of the hind wings is orange in front, and black, dusted with blue, behind. They expand from $2\frac{3}{4}$ to $3\frac{1}{2}$ inches.

The caterpillar is thick, shaped somewhat like a woodlouse, and contracted

behind. It is green, with yellow lines on the back and sides, and with yellow transverse lines spotted with red. It feeds on almond, sloe, plum, apple, pear, and oak.

The chrysalis is shorter than that of *Machaon*, and stouter in proportion, more decidedly bifid at the head, and more pointed at the tail. In colour it is ochreous, with darker streaks.

It is a common butterfly in Southern and Central Europe, North Africa, and West Asia, as Persia and Altai; and is met with in open places near woods, especially in hilly districts, in May and July.

It is said to have formerly inhabited England, but is now extinct. ("Kirby's European Butterflies and Moths.")

Described by Mouffet in 1634.

In 1710, the "Historia Insectorum," by John Ray, was published in London by Dr. Derham, and in it he writes of *Podalirius*, "Prope Liburnum Portum in Etruia invenimus, atque, ni male meminimus, etiam in Anglia."

In 1795, Dr. Berkenhout writes, "Rare, in woods."

In 1803, Haworth in his "Lepidoptera Britannica" writes, "My friend, the Rev. Dr. Abbott, of Bedford, has informed me that he took in May last, near Clapham Park Wood, in Bedfordshire, a specimen of *Papilio podalirius* is the winged state. An ingenious and practical friend," probably Mr. Rippon of York, "has informed me that he took two sorts of Swallow-tailed *Papilios* near Beverley, in Yorkshire, five-and-twenty years ago, but no specimens of them are now extant; a fire which, unhappily, destroyed great part of his property, having consumed them likewise."

In 1822, the Rev. F. W. Hope captured one in Shropshire.

In or about the year 1826, one was taken on the wing between Sough and Datchet, Berkshire, by Mr. Rudston Read, when a school-boy at Eton.

FAMILY PIERIDÆ.

GENUS II.—APORIA.

Hübner.

Apória, a figure in rhetoric, when the orator doubts what to do or say.—Cic. Att. 7, 21.

The antennæ are rather long and thick; and the wings, especially in the female, are semi-transparent.

APORIA CRATÆGI.

Black-veined White.

CRATÆGI, Linn. *Cratæg'i*, from the generic name of one of its food-plants—*Cratægus oxyacantha* (Hawthorn.)

Of the white butterflies found in England, next to *Daphidice*, this is the rarest. It is a delicate, and by no means inelegant insect, though altogether plain in its appearance, and may readily be distinguished from the other analogous species, by the extreme blackness of the veinings both of the upper and lower wings. From being very sparingly coated with scales, the wings are semi-transparent, differing much in this respect from the Large Cabbage White, which it equals in size, and might be mistaken for on the wing. It will be observed, that instead of the feathered fringe that surrounds the wings of most butterflies, they are bordered in this species by a stout nervure, forming a sharp outline, and giving a peculiarly chaste finish. The underside differs in no mentionable respect from the upper, which is a very rare circumstance amongst the butterflies. The female has a small smoke-coloured marking at the disc of the fore wings, which are generally of a browner tint than in the males.

The eggs are, according to Kollar, cylindrical, rather thinner at the ends than in the middle, longitudinally ribbed, and of a shining yellow colour. They lie exposed on the leaf, without being covered in any way, sometimes lying in rows one against another, sometimes in an upright position, to the number of one hundred and fifty. In a fortnight after being first laid, they change to a silvery colour, and look more deeply ribbed, and as if covered with beads at both ends.

The caterpillar feeds on the hawthorn, sloe, and various kinds of fruit trees. When young it is black, but becomes afterwards thickly covered with whitish hairs, and on the sides and underneath is of a dark grey colour, with two longitudinal stripes of red or yellow.

That accurate observer of Nature, accomplished scholar, and highly pleasing poet, the late Rev. Dr. Hurdis, has thus minutely described the birth and habits of the caterpillar:—

“ Hatch'd by the sunbeam from continuous cells,
 Around the slender apple-twigg combin'd
 In circuit orderly, egg glued to egg,
 Issue the caterpillar swarm minute.
 There left, oviparous, her half-born brood,
 Ere summer clos'd, the parent left and died.
 There have they still endur'd, and still surviv'd
 Sharp winter's tyranny; the bitter frost
 That slew the myrtle, and the lasting leaf
 Of the screen'd laurel chang'd, no death to them:
 Now busily convened, upon the bud
 That crown their genial branch, they feast sublime,
 And spread their muslin canopy around,
 Pavillion'd richer than the proudest king.

According to Moses Harris, the female lays her eggs on the whitethorn, about the latter end of June, and the young caterpillars, as soon as hatched from the eggs, enclose themselves in a slight web, leaving a passage to come out to feed, which they generally do morning and evening, retiring within their web in the middle of the day, to avoid the heat of the sun; in this manner they feed the remaining part of the warm weather, extending their web as they increase in size. At the approach of winter, they spin a strong web on one of the twigs, wherein they remain without eating during the winter, and come forth again early in the spring, feeding very greedily on the buds and young tender leaves. In preparing for their transformation, they fasten their tail to a twig by a strong white web, after which they carry a strong thread over their back three or four times, near the head; this is likewise made fast to the twig on each side. In this position they retain the form of the caterpillar twenty-four hours, and the chrysalis appears, which is of a yellow colour, beautifully streaked and spotted with black. They remain in the chrysalis state twenty-one days.

This butterfly is unknown as an inhabitant of Ireland, Scotland, or the Isle of Man, and does not occur in the North of England. It is common over the whole of the Continent, and of Europe, penetrating even into the the extreme North, Lapland only excepted. It also occurs in Western Asia, and Siberia, where Pallas saw it flying in such abundance in the environs of Winofka, that he took it at first for flakes of snow.

This very local English butterfly is briefly described by Dr. Merrett, in his *Pinax*, 1667; by Ray, in 1710; and by Petiver, in 1717, who adds, "It is found in meadows about June."

It was beautifully figured by Elezar Albin, who in the year 1731, published at London, his "*Insectorium Angliæ Naturalis Historia Illustrata*," and described it as follows:—"The caterpillar *a* in this plate is black and orange colour on the back, the belly and holders of a pale green ash colour, with a small black spot on each joint; the head and fore-feet of a deep black. They are commonly found feeding on the Whitethorn at the latter end of April, on which I fed them till the 12th of May, at which time one of them tied itself up by the tail, and cross the middle, and changed into a chrysalis marked *b* in the copperplate, of a deep yellow marked with black, out of which, the first of June, came *Papilio albus venis nigris*, the White Butterfly with black veins."

Of this work, Mr. Haworth writes, in "*Transactions of the Entomological Society of London*," 1812. "We recollect it to be the most elegant one of its day, and to contain principally, but not exclusively, such lepidopterous insects as the author, or his friends, had reared from the caterpillar state:

exhibiting them picturesquely feeding on their proper plants, and in all their phases or mutations; the whole highly coloured, and accompanied by descriptions in the English language. Yet Albin's is a work but poor in science, even for its time; and his insects are sometimes depicted in tints more remarkable for gaudiness than fidelity; this, however, may probably be no more than merely the fashion or error of its era." Albin, however, greatly benefited science by figuring many ichneumons and flies he bred from several of the lepidoptera.

Lewin in his "Insects of Great Britain" published in 1795, writes, "It is not very common or easily taken on the wing, as it flies pretty quickly over meadows and corn-fields." Haworth in 1803, adds, "It is frequently found in gardens."

Curtis in his "British Entomology" writes, "Fortunately this butterfly is seldom very abundant in England, and from the care taken of our gardens, it seems to become annually more scarce."

J. F. Stephens, writes in 1828, "This elegant insect is somewhat periodical in its appearance, at least near London. In June, 1810, I saw it in plenty at Coombe Wood, and in the following year I captured several on Muswell Hill, since which I have not seen any at large. Mr. Haworth informs me that it used to occur constantly at Chelsea, but he has not seen any of late. In the New Forest, near Brokenhurst, and near Herne Bay, in Kent, it abounds, and, I believe regularly." Curtis adds, "It has been taken in Norfolk, Suffolk, and Monk's Wood, near Cambridge; and Mr. Dale has captured it at Enborne, in Berkshire, and at Glanvilles Wootton, in Dorsetshire." The last specimen at the latter place was taken on June 10th, 1815.

In 1858, *Crataegi* appeared in considerable numbers at Herne Bay, Kent, and other parts of the Isle of Thanet; also near Cardiff, in South Wales, where in the middle of April, the caterpillars were found feeding by thousands upon insulated shrubs of *Prunus spinosa* (Common Sloe); and several were taken in the New Forest.

In addition to the localities previously mentioned, *Crataegi* has been recorded as occurring at Moreton, in Devonshire, at the Holm Bush in Sussex, near Petersfield, and Waltham, in Hampshire, in the Isle of Wight, at Barnwell Wold, in Northamptonshire, at Malvern, in Worcestershire, at Clevedon, in Somersetshire, and at Kimbolton, in Herefordshire.

In 1872, several were taken in the New Forest, in Kent, near Bristol, and in Herefordshire.

In 1882, a few specimens were taken near Festiniog, in North Wales.

It has now become a very rare butterfly, and has long been an extinct species in the counties of Devonshire, Dorsetshire, the Isle of Wight, Suffolk,

Norfolk, Berkshire, and Northamptonshire. Perhaps the cause of it may be explained thus:—Small birds, particularly the Titmice, devour the caterpillars soon after they are hatched, as well as in the following spring, when they are dispersed upon the shoots. So eager are the birds, that they break into their nests late in the autumn, to obtain them.—KOLLAR.

GENUS III. PIERIS.

Schrank.

PIERIS, one of the daughters of Piérus, fabled to have been metamorphosed into magpies, for challenging the Muses to sing better than themselves.—Ovid.

Antennæ long and slender; wings white; fore-wings rather pointed and tipped with black, in the female always with a black spot near the anal angle; chrysalis angulated.

This is one of the largest genera of Butterflies, and its members are distributed over the whole world. As defined by Kirby, it numbers nearly 200 species, of which eight are recorded as occurring in Europe.

We have four British species, all of which, *Napi* perhaps excepted, appear to be colonists, as are probably also the two species of *Colias*. Two of them, *Brassicæ* and *Rapæ*, as likely as not, were introduced into England amongst the pot herbs of the Romans. The three species—*Brassicæ*, *Rapæ*, and *Napi*—are very prone to variation, and the late Mr. Stephens elevated the different broods to the rank of species. The summer broods are much darker in colour than the spring, and in very hot weather *Rapæ* gets a yellowish tinge; of late years it has acclimatized itself in Canada. *Rapæ* is the first butterfly in the year to emerge from the chrysalis state, doing so, but very rarely, as early as February; and the caterpillars have been found feed-as late as Christmas. The two species, *Brassicæ* and *Rapæ*, are most frequently found in gardens; *Napi* more often in woods and lanes, and *Daplidice* on the sea coast.

PIERIS BRASSICÆ.

Large Cabbage White.

BRASSICÆ, Linn. Bras'sicæ, from the generic name of its principal food-plant, *Brassica oleracea* (cabbage.)

This is a very common butterfly in this country, occurring as far north as the island of Hoy, one of the Orkneys; and its caterpillar causes much damage in gardens, especially in and near towns, in dry seasons, which are favourable to their production.

It is very common throughout Europe, except the Polar regions, and also in North and East of Asia, and in Northern Africa.

There is a very brief description of it in Merrett's Pinax, published in 1667, but there is a very lengthy one in Martin Lister's edition of Goedart, published at London in 1685, giving a full account of its transformations.

The wings, which ordinarily expand from two and a half inches to two inches and three-quarters, are white, with a black crescent-shaped band at the tip of the fore-wings, and a black spot on the upper edge of the hind-wings. The female differs from the male in having a couple of black spots on each fore-wing, and also a black streak on the inner margin; the band across the tip is moreover much wider. The under surface of the hind-wings is greenish yellow.

Var. *b.* is distinguished from the typical variety, by the band on the tip of the wings not being jagged. It is generally rather smaller, but in other respects is not different.

Var. *c.* (*Chariclea*, Steph.) differs from the preceding, in the black band at the tip of the wings being paler. This variety is generally less than the typical ones. I have one which only measures one inch and three-quarters across the wings.

Var. *d.* is distinguished by having a black blotch at the base of all the wings. It was taken at Leicester, in 1843, and figured in the "Zoologist."

Var. *e.* Is distinguished by all the wings on both sides being of a dusky black colour. It is a female, and was taken near Perth, in 1868, and recorded in the "Entomologist."

The first brood comes forth from the chrysalis in the very last few days of April, or the beginning of May, and continues on the wing till June is nearly over. The second emerges towards the end of July, and lasts out till the middle of September.

The egg is a most graceful and interesting object. It reminds us of some antique vessel, ribbed and fluted with consummate elegance and regularity. The colour is dull yellow.

The caterpillar is bluish-green, with black dots and yellow streaks on the back and sides, and is slightly hairy. It feeds on cabbage and other species of *crucifera* in June, and also in September and October. "When about to change into the chrysalis state, it commonly fixed itself to the under-side of the coping of a wall, or some similar projection; but as the ends of the slender thread which serves for its girth will not adhere firmly to stone or brick, it covers the space of about an inch long, and half-an-inch wide, with a web of silk, to the base of which its girth can be securely fastened. This butterfly disposes its eggs side by side, so as to resemble a close column of

soldiers, in consequence of which, on hatching, those caterpillars which proceed from the upper end, cannot disturb the adjoining eggs. These caterpillars scale walls and even glass windows without difficulty; but in the last instance, if the square upon which the creature is travelling, be examined with a microscope, a visible tract like that of a snail may be seen. This consists of little silken threads, which it has spun in a zig-zag direction, forming a rope ladder, by which it can ascend a surface it could not otherwise adhere to. These threads being of a gummy nature, harden in the air, and easily attach themselves to the glass."—Miss Jermyn's "Vade Mecum."

The chrysalis is pale green, dotted with black. Bonnet states "that the chrysalids exposed to a frost of 14° R. below zero (C. "F.) became lumps of ice, and yet produced butterflies." There are two or three varieties of colour, of which the above is the commonest, Another variety is bluish green all over, with yellow ridges and spiracles, with the black spots much smaller and fewer in number. Another variety is mottled with the green and white tints.

This species is very subject to the attack of a Hymenopterous parasite—*Apanteles glomeratus*—concerning which is an interesting note in the "Magazine of Natural History," Vol. 3.:—"On the 28th of June, I put twenty caterpillars of the large cabbage white butterfly, into a wire cage, they were mostly full-sized, and continued to feed on cabbage leaves placed in the cage with them. On the following day, five or six of the largest left the leaves, and crawled about the sides of the cage during the rest of the day. The next morning, June 30th, I found them resting on large clusters of minute cocoons of an ovate form, the largest not exceeding two lines in length, and about the thickness of a caraway seed. Each one was enveloped with a fine yellow silk, resembling that of the common silkworm. On these clusters the caterpillars remained the whole day without moving. Fresh leaves were given to the rest, but in the course of this day they all left off feeding, crawled about the cage, but underwent no other change. The next day I found they had ejected the parasitical progeny they had been impregnated with, and like the preceeding, continued resting on the clusters they had formed, and the last operation of these devoted caterpillars was to envelope each cluster in a veil, formed of the most delicate web. Some of them executed the task, but the greater part were too feeble to complete it, and in the course of three days more, they became motionless, and gradually one after another fell to the bottom of the cage, exhausted and shrivelled. The clusters of cocoons varied in their number, some contained upwards of a hundred, others not more than sixty or seventy. On July 12th, the first-formed cluster of cocoons evinced a state of maturity, and in the course of the day, numbers of the perfect insect came forth. Their exclusion was

effected by forcing open a small circular lid at one end of the cocoon. The insects as they came forth, were active and ready for flight.”—T. H. 1829.

In Martin Lister’s edition of “Goedart,” 1685, is a very lengthy article on the present species. In it he says—“that he bred several ichneumons from the caterpillars, and also a species of two-winged carnivorous fly” and adds—“it seems contrary to the usual course of nature, that from one and the same animal an offspring of a different species should be generated, and that one and the same creature should procreate in three different way.”

The fly is *Exorista vulgaris*. Another parasite—*Apanteles rubripes* has also been bred from it. Two other insects of the same order—*Hemiteles fulvipes* and *Mesochorus aciculatus* are again parasitical on *Apanteles glomeratus*, thus illustrating the old rhyme—

“ Little fleas have lesser fleas
Upon their backs to bite 'em,
And these again have lesser fleas,
And so *ad infinitum*.”

This and the next species are the only British butterflies that can be charged with committing any appreciable amount of damage to human food and property. In the winged state indeed they are perfectly harmless, but not so the hungry caterpillars. Sometimes they are so abundant as to deserve the title of a plague of caterpillars. One of these plagues occurred in 1853 and 1854, at Rottingdean, in the County of Sussex, concerning which is an interesting note in the “Zoologist,” vol. 13, by the Rev. Arthur Hussey:—“For the last two years many of the gardens in this village have been infested with caterpillars to such an extent that the cabbages have been utterly destroyed. When the time for changing to the chrysalis state arrived, the surrounding buildings presented a curious appearance, being marked with long lines of the creatures travelling up the walls in search of a suitable place of shelter for undergoing their transformation. Among the myriads which wandered in search of a resting place, very rarely one of them would stop upon a wall exposed to the south or south-westerly winds. A great number of them took refuge in a malt-house, from which they could not escape as butterflies, the result being that for several weeks the malster swept up daily many hundreds of the dead insects. Probably a very durable green die might be obtained from the bodies of these cabbage-fed caterpillars, as years of washing have not effaced the stain of one crushed upon linen.”

Besides the Ichneumons previously mentioned, birds do much towards diminishing the numbers of these devastating caterpillars, and in his “Lepidoptera Britannica” Mr. Haworth writes thus, “I once observed a large tit (*Parus majos*) take five or six large ones to its nest in a very few minutes. In enclosed gardens, seagulls with their wings cut are of infinite service. I

had one eight years, that lived entirely all the time upon the insects, slugs, and worms which he found in the garden."

In the "Young Naturalist" for 1880, is a notice by the Editor on a flight of *Pieris brassicæ* at Hartlepool. "It was a fine hot day in June, with scarcely any wind, when my attention was attracted by an unusual number of them flying past. The butterflies rapidly increased in numbers, many hundreds, nay, thousands were in sight. They kept passing in such enormous numbers that Mr. Darwin's expression "snowing butterflies" is the most appropriate that can be used. From the direction of their flight, it was evident they came from the sea, and a fisherman told me, that he noticed them some miles off the land in immense swarms, some alighting on the boat, others appearing for a moment to settle on the surface of the ocean, and then rise from it again, the sea at the time being perfectly smooth. They seemed, he said, either to come from the open sea, or from the extreme end of the high Yorkshire land, that bounds our view on the opposite side of the Bay."

PIERIS RAPÆ.

Small Cabbage White.

RAPÆ, Linn. Ra'pæ, from the name of one of its food-plants—*Brassica rapæ* (Rape).

This is a more abundant butterfly than the last, especially in the West of England, and occurs probably all over the British Isles, although it has never been recorded from the Shetlands, but I have taken it myself in the Isle of Skye.

It occurs all over Europe except in the Polar regions, in North Africa, Northern and Western Asia, and Japan.

In North America it has only been lately introduced, but is spreading rapidly throughout Canada and the United States. The first specimen appears to have been taken at Quebec in 1858. What is more remarkable is, that a yellow variety (*Novangliæ*, Scudd) scarcely known in Europe, has appeared in America, and it will be interesting to see whether it will eventually become the dominant American form of the insect.

In the "Lepidoptera of Scotland" by Dr. Buchanan White, we read, "There seems some reason to doubt whether this species and *Brassicæ* are not introductions in the North, since they are probably never found at any distance from cultivation, nor the larvæ upon any but cultivated plants."

There is a very brief description of it in Merrett's Pinax, 1667; but a longer one in Lister's edition of Goedart, 1685.

The wings, which ordinarily expand from one inch and a half to two inches and a quarter, are white, with a black or triangular blotch at the tip of the fore-wings, and a black spot on the upper edge of the hind-wings. The male has one, the female two black spots on each fore-wing. The blotch at the tip is larger in the female than in the male. The under surface of the hind-wings is yellow.

Var. *b.* is distinguished from the typical variety by the upper surface of the wings being of a cream colour. There is no difference in the black markings. It appears in very hot weather, or early in the spring when bred under glass.

Var. *c.* differs from the preceding in the black blotch at the tip of the wings being paler, and the spots on the fore-wings being very indistinct.

Var. *d.* (*Metra*, Steph.) differs from the last variety by the spots on the fore-wings being entirely obsolete, and the tips are merely shaded by a few dark points. It generally appears in April.

Var. *e.* has all the wings above immaculate white, with the base black, and the apex of the hind-wings very obscurely clouded.

Var. *f.* is distinguished by having a deep black patch at the base of all the wings. In other respects, like the type. It was bred by myself in 1869.

Var. *g.* (*Novangliæ*, Scudd) is canary yellow. It is extremely rare in this country, but not so in America.

There are apparently three broods in the course of the year, the first appearing in April or even earlier, and stragglers of the last may be observed till past the middle of October; sometimes their third brood does not appear when a late or dull season has retarded the development.

The egg somewhat similar to that of the preceding species, is in shape like a flask, with longitudinal ribs, coming up neatly and evenly to the apex, and has delicate reticulation. It is at first of a pale greenish yellow, and afterwards becomes more yellow.

The caterpillar, very different to that of the preceding species, is of a dull-green colour, with a yellow dorsal stripe, and yellow dots on the sides. It differs also from *Brassicæ*, which only feeds on the outer leaves, by eating into the very heart of the cabbage, and is often cooked. The caterpillar has been observed late in December.

The chrysalis is either dusky-drab, rosy pink, or dull-green, and has three narrow greenish-yellow longitudinal stripes.

Rapæ in a similar manner to *Brassicæ*, is very subject to the attack of parasites, and the following have been bred from it—*Apanteles glomeratus* and *rubecula*, *Hemeteles fulvipes*, *Mesochorus aciculatus*, *Pteromalus puparum*, and *Exorista vulgaris*,

Both the Cabbage Whites, *Brassicæ* and *Rapæ* have strong migratory propensities, and are most abundant in some years, and very scarce in others, In 1868 particularly, they were very scarce all over Britian, although it was a fine hot summer.

In 1818, these species abounded so greatly near the Metropolis, as to attract the notice of the public journalists, and Mr. Stephens had a brood of *Brassicæ*, which were scarcely seven complete days in the chrysalis state, the thermometer during the period varying from 70° to 80°.

In 1842, a vast flight of white butterflies came over from the Continent to the Kentish coast; and Mr. Thorncroft published in the "Entomologist," the following interesting observations on the subject. "It was a still hot day, with hardly a breath of air, and now and then the common *Brassicæ* and *Rapæ* would lazily fly in. The flood tide set in about 3 p.m. with a gentle breeze, and then came a host of the above named butterflies with a few of *Napi*. What surprised my friends and myself was their alighting or settling on the sea with expanded wings, and the ease with which they rose again. The shore was covered with a coarse sort of rye-grass, on which they were resting when we returned home, and in walking through the tall grass, they rose in myriads." "On Sunday, the 5th of July, 1846, one of the largest flights of butterflies ever seen in this country crossed the Channel from France to England. Such was the density and extent of the cloud formed by the living mass, that it completely obscured the sun from the people on board of the Continental steamboats, and the decks were strewn with the insects in all directions. The flight reached Dover about 12 o'clock, and dispersed themselves along the shore and inland, darkening the air as they went. During the sea passage of the butterflies, the weather was calm and sunny with scarcely a puff of wind stirring; but an hour or so it came on to blow great guns from the South-West, the direction from which they came." —Extracted from the "Canterbury Journal."

Rapæ is a very thirsty butterfly, and fond of alighting on the wet mud at the edges of ponds. In London, it may be observed following the water-carts, and pitching on the recently sprinkled roads. More than once, in going by the steamer from Weymouth to Lulworth, in hot and calm summer weather, I have noticed a swarm of *Pieris rapæ*, two hundred or more in numbers, leave the land and fly out to sea. Sometimes the swarm would remain apparently stationary for a while, and the individuals would disport themselves somewhat after the manner of mayflies, evidently enjoying the vapour arising from the briny ocean.

PIERIS NAPI.

Green-veined White.

NAPI, Linn. Na'pi, from the name of one of its food-plants—*Brassica napus*.

This also is a common butterfly, but it prefers woods and hedge-rows to gardens, and is less often seen in towns than *brassica* and *rapæ*. It is generally distributed over the British Isles, but is not known to occur North of Rosshire.

This is a very common species throughout Europe, and also in the North and West of Asia, and Japan. Far north and also on the Alps, a suffused variety of the female (*Bryonia*, Hub.) is met with.

It is very briefly described by Dr. Merrett, in his "Pinax," 1667, and by Ray, in 1710.

Napi is easily distinguished from *rapæ* by the distinct greenish veinings, branching over the disk of the under surface of the wings. On the upper side, the fore-wings have dusky tips, and in the male there is a round black spot in the middle, not very remote from the upper margin; the female has two such spots on the upper wings. The hind wings have a black spot on the costa.

The expanse of the wings varies from one inch and four lines to two inches and two lines.

Var. *b.* differs from the preceding in being spotless.

Var. *c.* (*Sabellica*, Steph.) allied to the typical variety, but dissimilar in form, the wings being shorter and more rounded. The under side of the wings are adorned with very broad dusky veinings. I have one almost as dark as *Bryonia*.

Var. *d.* (*Napæ* Esp.) differs from the preceding by its larger size, by having much larger sized spots, and also by having a much larger blotch at the tip of the fore-wings. The hind-wings are rather pale, with the three veinings above, green and dilated. The under surface of the hind-wings have a yellowish tint, and the veinings are rather indistinct.

There are at least two broods in the year, the first appearing about the middle of April or May, and the second in the end of July, and continues on the wing to the beginning of October.

The egg is laid singly, on end, and is flask-shaped, with 14 longitudinal ribs, not meeting very neatly, and with regular delicate transverse reticulation. The colour is at first pale green, afterwards becoming more pale and silvery; thus, although much like the egg of *rapæ*, it is longer, not so neat

at the apex, and always greener in colour.—From Appendix to “Buckler’s Larvæ.”

The caterpillar is much like that of *rapæ*, but can be known from it by its lighter green, by the absence of a yellow dorsal line, by the single yellow spot in each segment enclosing the spiracle, and by the absence of black dots below the spiracular line. It feeds on various species of the cress kind, in June and in September.

The chrysalis is either of a very pale pink buff, or of a light green colour.

PIERIS DAPLIDICE.

Bath White.

DAPLIDICE, Linn. Daplidice, one of the twenty-nine daughters of Danaus, King of Argos, who killed their husbands in obedience to their father’s orders.

This, one of the rarest of our British butterflies, varies in the expansion of its wings from an inch and a half to a couple of inches. The wings are white, with a shade of cream colour. The fore-wings, which are unusually pointed, have a large black spot (very large in the female), a little above the centre; and a black band at the tip, in which are situated some white spots. The underside of the hind-wings are irregularly mottled with green and white.

The female differs from the male in having a black spot near the inner margin of the fore-wings, and also by the hind-wings having some blackish markings.

The egg is of a bright pinkish red, and in shape very much like a cupless acorn.

The caterpillar is dull blue, striped with yellow and dotted with black, and has a green head. It feeds on mignonette and weld in June, and also in September.

The chrysalis is dark grey, with numerous black dots.

The late Mr. Buckler, proved by experimenting on the caterpillar, that it is a species quite unsuited to our climate, and belongs to a warmer country.

The Chequered or Bath White is common over Central and Southern Europe, especially along the shores of the Mediterranean, as well as on the opposite coasts of Asia and Africa. It is mostly found in dry and sandy situations, and I have seen it flying plentifully, in company with other Whites, over the slopes of the Metropolis at Athens.

The first person to record it as a British species was Petiver, who in his

"Gazophylaci Naturæ et Artis," published at London, in the year of our Lord, 1702, wrote thus "Vernon's Half Mourner. *Papilio Leucomelanus Cantabrigiensis nobis*. I do not know of any that has met with this in England, but Mr. Vernon about Cambridge, and there very rare." He adds in his "*Papilionum Britanniae Icones*," published in 1717, "This has also been found about Hampstead in July or August."

In Ray's "*Historia Insectorum*," published in 1719, we read "A. D. Vernon habui, qui in agro Cantabrigiense eam invenit. Eandem D. Jezreel Jones circa Lisbonam, observavit, referente D. Petiver." He calls it "The Greenish Marbled Half Mourner."

In his "*Insects of Great Britain*," published in 1795, Lewin informs us that "It was named the Bath White, from a piece of needle work executed at Bath by a young lady, from a specimen of this insect, said to have been taken near that place. On my examining the insects purchased by J. T. Swainson, Esq., at the sale of the late Duchess Dowager of Portland's subjects in Natural History, I found this insect mixed with the female Orange-Tip; and it then appeared to me that some person collected this box of butterflies, and sent them to the Duchess, and from the great resemblance of this to the female Orange Tip, the difference of this rare species passed without being noticed."

Donovan in his "*Natural History of British Insects*" published in 1796, observes "That it is only found in the environs of Bath."

In the Preface to Haworth's "*Lepidoptera Britannica*," written in July, 1803, we read thus "Since the body of this work was printed, my friend, the Rev. Dr. Abbott, of Bedford, has informed me that he took in May last, near Clapham Park wood, in Bedfordshire, a specimen of *Papilio podalirius* in the winged state; and that he also took in June last, in White wood, near Gamlingay in Cambridgeshire, the *Papilio daphidice* in a faded state, and likewise *Papilio lathonia*. These are three extremely interesting species, and there is not a British specimen of any of them extant, except the above."

Dr. Abbott died in 1817, and his insects were purchased after his death by Mr. Dale.

The next specimen, a female, was taken by J. F. Stephens, Esq. on the 14th day of August, 1818, in the meadow behind Dover Castle. Another was taken that same year, by Mr. Miller, at Keynstone, between Bath and Bristol.

None appear to have been taken again till August, 1826, when it was met with by Mr. Leplastrier, at Dover, and by him again in August, 1835, and 1842: the latter specimen fortunately laid some eggs, from which Mr. Leplastrier reared four fine females and one male the following May.

In 1836, a specimen was captured by Mr. R. Dawson, in Roseberry Wood, near Exeter.

In 1852, one was taken near Whittlesea Mere, by Mr. Buxton.

In 1857, one was taken near Colchester.

In 1859, captures at Dover, Kingsdown, Brighton, and Tenterden, in Kent, were made and recorded.

In 1868, specimens were taken at Margate and Dover.

In 1870, two specimens were captured at Portsmouth, and one at Brighton.

In 1871, specimens were taken at Folkestone, Sandgate, St. Margaret's Bay, and Brighton.

In 1872, there were no less than four of *Daplidice*, nine of *Lathonia*, and two of *Antiopa*, taken at Dover by different persons, all three species being unusually common that year. Specimens of *Daplidice* were captured besides at Christchurch, Portsmouth, Brighton, Folkestone, Eastbourne, Deal, and Margate, Felixstow, and Newmarket.

In 1876, one specimen was taken at Southend, and another at Folkestone.

In 1884, a pair were taken at Dover.

In 1885, a couple were taken at Folkestone.

GENUS IV. ANTHOCHARIS.

Boisduval.

ANTHOCHARIS. Anthos, a flower; Chaireis, to delight in.

This genus is found throughout Europe, Asia, North Africa, and the western part of North America. The males may be readily distinguished from all butterflies by the orange tips of the fore-wings. The antennæ are slender and rather short, and the abdomen is slender. Another distinguishing mark of this genus is the chrysalis, which is very peculiar, and looks like a boat in miniature.

ANTHOCHARIS CARDAMINES.

Orange-tip.

CARDAMINES, Linn. Cardami'nés from the generic name of one of its food-plants. *Cardamines impatiens* (Cuckoo flower.)

This truly exquisite and lovely little creature makes its appearance in April, and continues to flit gaily along by hedgerow and woodside to the beginning of July, charming vernal rambles in the country, whether entomological or no, by its merry blossom-like appearance.

The male is well known and common, but the female is scarce, and much resembles *Pieris daphidice*, from which, however, it may be distinguished by the more rounded tips of the fore-wings, by its shorter antennæ, and by having a smaller lunule spot at the centre of the fore-wings. The ground colour is white. The underside of the hind-wings is chequered with green and white.

The expanse of the wings varies from one and a quarter to a couple of inches.

Var. *b*. Both sexes with a black spot on the upper surface of the hind-wings.

Var. *c*. Both sexes with the black spot on the fore-wings nearly obliterated.

Var. *d*. Female with a V shaped greenish-yellow spot on the under surface of the fore-wings, placed between the lunule spot and the inner margin.

Var. *e*. Male with a large and oblong lunule spot.

Var. *f*. Differs from the type, by the patch on the fore-wings of the male being yellow instead of orange.

Var. *g*. Male with a hardly discernible orange patch. This variety, which was in Mr. Haworth's collection, is probably an hermaphrodite.

The egg, which is laid in May or June, is of a yellowish-white colour.

The caterpillar is green, slender, with a white lateral stripe, and covered with raised dots bearing fine pubescence. It feeds on *Cardamine impatiens* and other Cruciferæ, in July and August.

The chrysalis is green, with a pink anal tip, and in shape greatly resembles a canoe.

It has a wide distribution in Europe, and is found also in the North and West of Asia.

In Britain, Forres appears to be its northernmost limit.

Mouffet figured and described it in 1635.

GENUS V. LEUCOPHASIA.

Stephens.

LEUCOPHASIA. Leukos, white; phasis, appearance.

The fore-wings are long and narrow without any discoidal spot, the antennæ are slender and rather short, the abdomen is rather long and very slender.

As yet only two species are known, and both are European.

LEUCOPHASIA SINAPIS.

Wood White.

SINAPIS, Linn. Sina'pis, named after the Mustard (*Sinapis nigra*), formerly supposed to be its food-plant.

The wings, which vary from one inch five lines, to one inch and seven lines in expanse, are white, with an ash-coloured blotch at the tip of the fore-wings, this blotch is of a much fainter shade in the female than in the male. The underside of the hind-wings has some obscure dull-green markings.

Var. *b.* Has the blotch of a deep black colour.

Var. *c.* (Summer brood) differs from the type in being of a more creamy white.

Var. *d.* (*Diniensis*, Boisd.) differs from the type in wanting the green markings on the under surface of the hind-wings; and the blotch at the tip of the fore-wings is smaller, and sometimes surrounded with white.

Var. *e.* (*Erysimi*, Bork.) of the female has the wings of an immaculate white without the blotch.

This variety has occurred in the New Forest.

The egg is of a glistening yellowish-white colour, and resembles a cucumber in shape.

The caterpillar, which feeds on the vetch (*Vicia cracca*) and other Leguminocæ in June and July, and also in September, is of a lovely delicate green, with a darker green dorsal line, and a distinct yellow spiracular line.

The chrysalis is very beautiful. In shape it is slender, very acutely pointed at the head, but not so much so at the tail. It has a yellow streak on both sides and white spots, otherwise it is green.

This is the most delicate butterfly we have, and the slenderness of its abdomen reminds one of the exotic genus *Leptalis*. It has a wide range on the Continent of Europe, being only wanting in the Polar regions. It also occurs in the North-west of Asia. The first brood is on the wing in May and the beginning of June, and the second in the end of July and in August. On a wet day it may be found settled on the underside of a leaf, in a shady lane, with its long wings pointed towards the ground.

Although found in most of the English and Welsh counties, and abundantly at Galway and Killarney in Ireland; it is a local species, frequenting the shady pathways and outskirts of woods, and flitting along with an undulating motion. Its extreme whiteness, combined with slow flight is as much an emblem of purity and innocence, as an ordinary butterfly is of the human soul. In 1865 and 1866 it occurred rather commonly in Dorsetshire and Devonshire, but in some years it is very scarce.

It is described in Ray's "Historia Insectorum," 1710; and Petiver, in 1717, wrote "I have observed this in Hampstead and other woods in June."

GENUS VI. GONEPTEREX.

Leach.

GONEPTEREX. Gonos, angular; Pteris, a wing.

This is also a small genus, possessing a little over a dozen species, only two of which, *Rhamni* and *Cleopatra*, occur in Europe. A distinguishing feature is that the body, which is rather stout, is covered with long silky down. All the wings possess an angular projection. The antennæ are short, rather thick, and of a red colour, hence Boisduval named the genus *Rhodocera*.

GONEPTEREX RHAMNI.

Brimstone Butterfly.

RHAMNI, Linn. Rham'ni, from Rhamnus the generic name of its food-plants, the Buckthorns.

The general colour of the male is a clear brilliant yellow, much like that of the Daffodil, its contemporary; and in the centre of each wing is a small spot of rich orange. As the male, from his colour, bears the name of "Brimstone" or "Sulphur," so the colour of his consort may be accurately compared to the tint of another chemical preparation, called "Milk of Sulphur." On the wing she is often mistaken for the Large Cabbage White. The expanse of the wings varies from two inches four lines to two inches and six lines.

Var. *b*. Male with the wings clouded, and minutely dotted and streaked with orange.

Var. *c*. Male with an orange patch on the fore-wings, somewhat resembling *Cleopatra*.

The egg is laid singly, generally on a rib of the under side of a buckthorn leaf in April or May. At first it is of a silvery-green, but afterwards turns to a yellow. In shape it is cylindrical, and resembles a flask.

The caterpillar, which feeds on buckthorn and blackthorn, and also, according to Lewin, on the wild rose, in June and the fore part of July, is of a dull green colour, and has a white lateral streak. It is subject to the attack of an hymenopterous parasite—*Limneria vulgaris*, which, according to Mr. Bignell, forms its cocoon inside of the caterpillar, and so constructs it, that the skin of the caterpillar is made to do duty for an extra protection,

The chrysalis is green, with several red dots; it is very gibbous in the middle, and attenuated like a boat in front; it is attached to the tail on a perpendicular branch, and fastened with a loose silken thread round the middle of the body.

The duration of the three stages of egg, caterpillar, and chrysalis must be limited to something less than two months; as the remainder of the year is passed in the perfect state.

The butterfly emerges from the chrysalis state at the end of July or in August, continues on the wing till the cold weather sets in, and then retires to its winter quarters. It does not, however, remain in them very long, and may often be seen sporting about in some flowery nook in the first sunny days of February and March, looking more like the petals of the primrose over which it hovers, floating on the breeze, than a living creature—

"As if Flora's breath, by some transforming power,
Had changed a flower into a butterfly."

Sometimes this tenant of the garden and the flower bed, may be seen, like infancy by the side of age, sporting on the front of some old grey rock, or settling on the wild thyme,—or on the golden furze,—as its wings vibrate with a quickness that will dazzle the sight.

"Behold again with saffron wing superb
The giddy Butterfly. Releas'd at length
From his warm winter cell, he mounts on high,
No longer reptile, but endowed with plumes,
And through the blue air wanders; pert alights,
And seems to sleep, but from the treacherous hand
Snatches his beauties suddenly away,
And zigzag dances o'er the flowery dell."

Favourite Village.

Mouffet was the first English author to figure and describe it, which he did in 1638.

Petiver in 1717, called it—"*Papilio sulphureus*," adding—"it is amongst the first to appear in the spring and again in the autumn," and of the female says—"this being so nearly white often escapes as common."

Abroad it has an extended range, being found all over Europe and Asia, in North Africa, and even in California.

It has not been observed in the Isle of Man, and but once in Scotland; in Ireland it is common at Killarney and in Connemara; in England it is very generally distributed and common, but is rather a southern than a northern species, being restricted in its range by the food-plant, which does not extend into the more northern counties. In 1861 my father did not see a specimen the whole season, and it was also scarce for two or three years afterwards.

GENUS VII. COLIAS.

Fabricius.

COLIAS, Linn. Colias, a surname of Venus, from a promontory of Attica, at which she was worshipped.

This genus is met with in almost every part of the world except Australia, New Zealand, the East and West Indian Islands, and perhaps Central Africa. It occurs all over Europe. In Asia it is found from Nova Zembla and Siberia to the Southern parts of India; in Africa it occurs from Egypt and Abyssinia to the Canary Islands and again at the Cape of Good Hope; in America from Grinnel Land and Boothia Felix, to Tierra del Fuego; and it is also found in the Sandwich Islands. It is, however, very much confined to the mountains in the inter-tropical countries. On the mountains of Europe, some species are found almost up to the regions of perpetual snow; and on the Himalayas, one species occurs at the great elevation of 17,000 feet.

The prevalent colour of all the species is yellow or orange, sometimes verging to white in the females, sometimes, as in the most northern species, to a greenish hue. Near the centre of the hind wings is a deep orange spot.

The antennæ are short and rather thick, and like those of *Gonepteryx*, of a reddish colour.

The males exhibit a character, often overlooked, which serves well to distinguish the species. It is a kind of a glandular sac placed upon the anterior edge of the hind-wings near the base. It is large in *Edusa*, small and lenticular in *Myrmidone*, and wanting in *Hyale* and *Chrysothome*.

About thirty species are known, nine of them occurring in Europe.

Our two British species are both noted for their periodic appearance. These periods were supposed to be influenced by the eggs or chrysalids lying dormant, but our knowledge of this genus will warrant us in considering all these suggestions as arbitrary, and unsupported by facts. It is possible, that the females may occasionally forsake the ordinary habit of the species of flying up and down one or two clover fields for hours or indeed for days together, and fly, as they can do, swiftly across the country, re-enforced by a few immigrants from the Continent, laying a few eggs here and a few eggs there, in the various clover fields over which they pass; and that the caterpillars in a favourable summer feed up rapidly, escaping their worst enemy in this climate,—mould; and so the perfect insects might be found, earlier or later, according to the climate, some inland, and large numbers in those coast districts, in which they usually occur.

Some species of the genus have been observed at great distances from land. Mr. Charles Darwin names an instance worth quoting. "One evening, when

we were about ten miles from San Blas in California, vast numbers of butterflies, in flocks of countless myriads, extended as far as the eye could range. Even by the aid of a glass it was not possible to see a space free from butterflies. The seamen called out that it was snowing butterflies, and such, in fact, was the appearance. More species than one were present, but the main part belonged to a kind very similar to, but not identical with, the common English *Colias edusa*. The day had been fine and calm, and the one previous equally so, with bright variable airs; hence, we cannot suppose that the insects were blown off the land; but we must conclude that they voluntarily took flight."

The species was most probably *Colias chrysotheme*, which is found in a limited district of Central and South-Eastern Europe, but in North America occurs over a very wide range.

In his "Illustrations of British Entomology," James Francis Stephens figured and described a North American species, *Philodice* as British, under the name of *Europome*. Two others—*Palæno* and *Myrmidone*—have also been erroneously recorded as British.

COLIAS EDUSA.

Clouded Yellow.

EDUSA, Fab. Edù'sa a Roman divinity, worshipped as the protectress of children, and supposed to bless their food.

The wings, which expand from one inch and eight lines in some examples, to two inches and five lines in others, are of an exceedingly rich orange-yellow or saffron colour; and have a broad dark brown or nearly black border. This border is marked in the male with thin yellow streaks, and in the female with pale yellow spots. There is a beautiful rosy tinge in the fringe of the wings and on their front edge. The underside of the wings is of a paler yellow than the upper, taking a citron hue in some parts, and marked with black and brown. In the centre of each hind-wing is a brown-circled silvery spot.

In shape it varies considerably, especially in the hind margin of the fore-wings, which is either rounded, straight, convex or concave, and curved; the inner margin also varies, as does the shape of the hind-wings.

The colour is also subject to much variation. The brilliant orange or saffron varies in intensity, and there is the greenish-white variety of the female called *Helice*; intermediate shades between these two are to be met with, and specimens have been taken with the fore-wings of *Helice* and the hind-

wings of *Edusa*, and again with one side *Helice* and the other side *Edusa*. Some specimens are beautifully shot with blue or purple.

Var. *b.* of the female (*Helice*, Hubner) differs from the type in being of a greenish-white, in place of orange-yellow or saffron.

Var. *c.* very small, with the hind-wings subfalcate, but coloured as in the type.

Var. *d.* (erroneously supposed to be *Chrysothome* by Mr. Stephens) differs chiefly from the type in its smaller size, in the rotundity of the hind-margin of the hind-wings, its paler colour, the dissimilar form of the marginal fascia, the expanded duskiness of the base of the wings, and the black discoidal spot on the under surface of the hind-wings being paler in the middle.

Var. *e.* very much suffused with black. Suffusion is more or less common to most species; and the Canadian entomologist, Mr. W. H. Edwards, considers the application of severe cold to the chrysalis as a cause.

The usual time for *Edusa* to be seen on the wing is from August to the chilly month of November, but occasionally there is an earlier brood in May and June. The variety *Helice* is liable to be mistaken on the wing for *Melanargia galathea*, especially in chalk districts, which the latter frequents.

The eggs are oval, but very sharply pointed at each end, and are laid on the upper surfaces of leaves in an upright position, standing on end. They are shining, and at first whitish-yellow, but they rapidly turn to a darker yellow, and afterwards to pink.—Buckler.

The caterpillar, when young, is of a pinkish-brown, but afterwards changes to a velvety green. It has a yellow spiracular line, a red spot on each segment below the spiracles, and a white mark on the upper part. In general appearance it is very like that of *Pieris rapæ*, but the red marks at the spiracles are a safe guide for distinguishing them. It feeds on various kinds of *Trifolium* or clover, medick, melilot, and other Leguminosæ in June and July, and also in September and October.

The Chrysalis is moderately stout, but not so angular as those of the White Butterflies. The colour of the back and body is a very pale yellowish-green, with a pale yellow stripe on each side the wing-cases, which are long and well developed, projecting below the abdomen. The head is sharply pointed, and is of a dark olive-green above, and of a pale primrose yellow underneath.

It is a generally distributed species over Western, Central, and Southern Europe; the Azores; North Africa, and Syria. At the Cape of Good Hope, it is replaced by a closely allied species, the *Electra* of Linnæus; and in Lapland and Greenland by *Hecla*.

It may be found throughout the year on the Continent, even as early as February at Malta, but it is rarely seen in England before August. It is a

much commoner butterfly than *Hyale* in the British Islands, though rarer on the Continent, and is somewhat irregular in its appearances. It was particularly abundant in Britain, in 1877, but by no means so elsewhere. Clover and lucerne fields are its favourite resorts, though flowery meadows, grassy slopes near the sea, and the sides of railway banks are also the scenes of its lively flight. It has also a marked preference for the South Coast, though in 1877 it occurred all over Great Britain and Ireland, even as far north as the Orkney Islands. In one season, perhaps, hardly a solitary specimen will be seen, then in the very next, a swarm of them will spread over the Southern Counties, delighting the collector, and puzzling the naturalist to find a sufficient reason for this sudden burst of insect life; then for three or four years together it will be very scarce again. None make a finer show in the cabinet, and few tempt pursuit more strongly, than this richly coloured and nimble-winged beauty; therefore it has always been a favourite, and captures of it have been more frequently recorded in the magazines and newspapers than of any other species.

The first in England to figure and describe it was old Mouffet, in 1633.

In Ray's "*Historia Insectorum*," 1710, we read, "In Essexia non procul à Bocking oppido in agro Lino fato invenimus, Eadem à D. Vernon in agro Cantabrigiensi capta, æ ad nos delata est Hæc, observante D. Willughby, in Stiria frequens est. Unde Patet multas Papilionum species Angliæ cum reliqua Europa communes esse."

In Petiver's "*Papilionum Britannicæ Icones*," 1717, we read, "*Papilio crocea*, limbo nigricante. The Saffron Butterfly seen about Deptford, Peckham, &c., from June till September."

In Harris' "*Aurelian*," 1775, we read, "This beautiful fly is taken in meadows in the month of August, they fond of settling on the yellow lupins and thistles. They have been taken flying in plenty in Epping Forest, but as they seldom haunt one place for many successive seasons, I cannot venture to mention it as a place where they are to be found. Where there is a brood, the times of the day to find them are at eight in the morning and four in the afternoon, but never in the middle of the day, when they conceal themselves to rest. They fly very fast, therefore not easily taken, the male in particular flies exceedingly fast." To this my father adds a note "I never saw them fly but in the middle of the day."

In Donovan's "*Natural History of British Insects*," 1792, we read, "With us it has ever been esteemed as a rare insect, though seen this season in Kent in greater plenty than for several years; but as they were probably only an accidental brood, they may again disappear for a considerable time."

In Lewin's "*Insect of Great Britain*," 1795, we read, "This beautiful

species of butterfly is peculiar to rich meadow lands, and not common. It is on the wing the latter end of August and the beginning of September. I have met with it in many different places, but never have seen more than two or three flying at a time. It is quick in flight, and not easily taken, except about eight or nine o'clock in the morning, when feeding on the flowers then in bloom." A retrospect of the occurrence of *Colias edusa*, in Britain, since the days of Lewin, may not be without interest.

In 1797, it occurred in great plenty at Wrentham in Suffolk.

In 1804, it was abundant at Clapham and other places near London, and also in Dorsetshire, and the Isle of Wight.

It was also common in 1808, the year in which my father began his "Entomological Diary."

In 1809, *Edusa* was very scarce, but one of the white variety was seen at Thetford, and plenty of *Hyale* at Horning, Norfolk, by Mr. Mack.

In 1810, I can find none recorded.

In 1811, it was very common, and several were taken in June.

In 1812, I can find none recorded, and very few for 1813 and 1814, and none in 1815, 1816, or 1817. The winter of 1813-14 was so severe that an ox was roasted on the Thames.

In 1818, a splendid year for butterflies and one with an unusually hot summer, it occurred abundantly, and a few were taken in the month of July.

None were recorded in 1819, a good year for *Antiopa*, 1820 and 1821, a good year for *Hyale*.

It was common again in 1822, but none were recorded in 1823 and 1824, and but one in 1825.

It was common in 1826, the "*Annus mirabilis*" of English Entomologists, and so were also *Hyale*, *Cardui*, *Atalanta*, and *Phlaeas*.

None were recorded in 1827, 1828 and 1829; 1829 a year which had a remarkably wet sunless summer, followed by one of the most severe winters of the present century, there being, even at Florence in Italy, forty-eight days of frost; nor in 1830.

It was plentiful in 1831, there being a considerable flight in the neighbourhood of Dover, during the months of August and September.

Scarce in 1832, a year which had a cold backward spring, succeeding a mild and open winter; 1833, though common in Jersey, and 1834.

It was common in 1835 (appearing in profusion at Killarney), as was also *Hyale*, and it was also common in 1836.

It was scarce in 1837 and 1838, but common in 1839, many being taken in June.

It was scarce in 1840, 1841 and 1842; 1842 a year which had a remarkably

fine hot summer, and one which produced *Hyale* in more than usual abundance, and very favourable to the production of insect life. Of 1842, the Rev. W. T. Bree writes, "Mr. Le Plastrier informs me that they had no Clouded Yellows last summer about Dover, except *Hyale*, where, in certain seasons, they are to be seen in considerably plenty." The White butterflies were particularly abundant that year.

In 1843, it was abundant again, and it was also very common in 1844, as was also *Hyale*.

In 1845, it was particularly scarce, and none were recorded in 1846 a good year for *Antiopa*.

It was scarce in 1847, but one was taken in the Isle of Arran (first in Scotland), once recorded in 1848, none in 1849 and 1850, one in 1851, scarce in 1852, and none recorded in 1853 and 1854.

It was common in 1855 and 1856, very common in 1857, one being taken as late as the 18th of November, and also very common in 1858, especially in June, but still taken as late as November 7th.

In 1859, a year with a fine hot summer, it was very abundant all over England, but *Hyale*, which was common in 1857 and 1858, was very scarce; it was, however, a good year for the *Sphingidæ* or Hawk-moths.

It was very scarce in the cold sunless years of 1860, 1861, 1862, & 1863.

It was common in the fine seasons of 1864 and 1865.

Several were taken in 1867, 1868, a year with a particularly hot summer, the great season for *Hyale* and the *Sphingidæ*, and in 1869.

It was very scarce in 1870, a fine year, and probably the driest of the present century.

It was only once recorded in 1871, and was not common in 1872, the great year for *Antiopa*.

In 1873, not a specimen appears to have been taken, and very few in 1874.

It was common again in 1875 and 1876.

Now comes its great year—1877, in which it appeared in greater numbers than it had ever been known to do before, occurring in many places where it was previously unknown, as for instance the Orkney Isles. Several of the white variety *Helice*, were also taken that season. Although so abundant in Britain that year, it was very scarce on the Continent.

One of the grandest sights I ever saw in my life, was on a little undercliff to the East of Lulworth Cove, on the 5th of September, 1877. On this undercliff grows a mass of *Inula Crithmoides*, then in full bloom; below is the clear blue water of Weymouth Bay, unruffled by a ripple. Every one of its yellow flowers was literally covered with one, two, or more of *Colias edusa*, with its white variety *Helice*, *Cardui*, *Atalanta*, *Rapæ*, *Io*, *Phælas*,

Janira, Corydon, Alexis, Agestis, Sylvanus, Linea, Actæon, and Galathea.

The year 1877 began with an exceptionally mild wet winter, and a long, chilly, disheartening spring, so writes C. Barrett, Esq. However, with the beginning of June, the weather began to improve, and, on the 4th, our first warm day, *Colias edusa* made its appearance. Two days later, I found several more, and from that time until the 4th of July, they were to be found in moderate numbers all over the country on every sunny day. It is a curious circumstance, that along with *Edusa* there appeared an early brood of *Scopula ferrugalis* in considerable numbers. By the end of the first week in August, after a deal of wind and rain, the second brood of *Edusa* appeared, again accompanied by *Scopula ferrugalis*, but not by *Hyale*. September was a beautifully fine and warm month throughout, and *Edusa* appeared in the greatest profusion, but gradually got scarcer and more worn and feeble towards the end, so that the conclusion forced itself upon one's mind, that hibernation in their case was impossible, as they would have insufficient vitality.

In some sheltered situations in Kent, and other parts of the South Coast, a third brood appeared in October, and continued on the wing till the second week in November, when the chilly blasts of the coming winter became too much for it.

On the 6th of August, 1877, the late Mr. William Buckler hearing that the second brood of *Colias edusa* was flying in great profusion, induced a friend to net him a few of the shabbiest females he could meet with. By the evening one of these laid some eggs, which hatched in a few days. The caterpillars continued to feed and grow, consuming a great deal of food, and stripping bare the stems of plant after plant. On the approach of cold frosty nights, they remained stretched out still and passive, seeming to feed only by day. On the 15th of October, one changed to a chrysalis, followed by two more on the following day. On the 22nd, another assumed the chrysalis state, and by the 27th, eight other caterpillars had spun themselves up in a horizontal position, in a similar manner to those of the genus *Pieris*. It was formerly supposed to hibernate in the perfect state, and it was first found to do so in the chrysalis state by Mr. Dale, in the year 1867.

In 1878, after another mild winter, a few imagos of *Edusa* were seen in April, May, and June, after which it was particularly scarce. One, however, was taken on ivy bloom in the middle of December.

In 1879, the great year for *Vanessa cardui* and *Plusia gamma*, and one which had the wettest and most disastrous summer of the present century, it was abundant in Kent and Sussex during the month of September, but apparently not so in other parts of England.

It was scarce in 1880, 1881, 1882, 1883, and 1884. The winters of 1880 and 1881 were very severe.

In 1885, a year with a fine late summer, it was fairly common, but very scarce again in 1886.

COLIAS HYALE.

Pale Clouded Yellow.

HYALE, Linn. Hyale, a nymph in the train of Diana. Ovid, Met. III. 470.

The wings of this interesting butterfly are of a primrose yellow, and are from two inches, to nearly two inches and a quarter in expanse.

The sexes are nearly alike in their markings, the chief difference being in the paler ground tint of the females.

There is some risk to beginners of confounding this species with the white variety of *Edusa* named *Helice*, so it may be as well to point out the principal distinction between the two. The dark border of the upper wings of *Edusa*, is of nearly equal breadth along the whole of the outer margin, and at the lower corner is continued inwards for a short distance; whilst in *Hyale* this border narrows rapidly, and disappears before reaching the lower corner of the wing. The dark border of the hind-wings also is much broader in *Edusa*, than in *Hyale*.

Var. *b.* differs from the type in the ground tint of the wings being almost white. It is admirably figured in Lewin's "British Insects" and is the var. *pallida* of Robson and Gardner's list.

Var. *c.* has the fore-wings suffused with black scales as far as the discordial spot.

There are also other varieties: one has only a few black marks at the tip of the forewings; another has the border so broad that, but for the want of it on the hind-wings, it might do duty for *Helice*. One variety has been named *Sareptensis* by Dr. Staudinger. It has the hind margin of the fore-wings broadly black, and occurs on the southern Steppes of Russia.

The egg is apparently smooth, but really ribbed and of a pale canary-yellow, reminding one of a canary seed in miniature.—Buckler.

The caterpillar is of a dull green colour, with a white or yellow spiracular line, and the whole skin covered closely with short black spines or bristles. It feeds on *Trifolium repens* and *Medicago lupulina*, Lucern, &c., in August and also in October. In repose, it lies along the middle of the leaf's superior surface, so that at night when the leaf closes, as most, if not all, of the *Trifolium* tribe do, it is quite enclosed by its segments.

The Chrysalis is very similar to that of *Edusa*, green, with a yellow lateral longitudinal line.

This interesting butterfly used to be considered a great rarity in England, frequenting the South Eastern corner, but has been gradually extending its range, along with the increasing cultivation of lucern and various other species of the clover kind, on which the caterpillar feeds, and amongst the seeds of which the eggs may possibly be introduced into fresh localities. It is double-brooded, but is commonest in Central Europe in the autumn, though in the South it may be found throughout the year, and has been noticed in Malta as early as March.

Its range extends over the whole of Europe except the North, Western and Central Asia, China, and Japan (where there is a very striking temperature form, measuring only one and three quarters of an inch in expanse, and emerging in February); the Mauritius, and North Africa. It is generally one of the very commonest autumn butterflies in fields and meadows on the Continent of Europe; and its flight is much less rapid than that of *Edusa*.

This species appears to have been first observed in England by Lewin, who in his "Insects of Great Britain" published in 1795, wrote thus, "This is a very rare species of butterfly. In all my researches after insects I never met with it but in the Isle of Sheppey, and on a hilly pasture field near Ospringe in Kent. I found it in different years in both places, and it appeared to be locally attached to the spot. It is out in the winged state the middle of August, and is not difficult to take on the wing, as it does not ramble far or fly swift." Of the white variety he writes, "This species is likewise very rare. I met with a brood of these butterflies in a gravelly pasture field in Kent, and they were all of the same pale yellow colour, but in every other character they perfectly agreed with the above described; and it is a doubt with me, whether this be a distinct species, or only a variety in colour. This fly is likewise on the wing the middle of August."

In 1803, it was recorded as being very rare, by Mr. Haworth.

In 1809, it was seen in plenty at Horning, Norfolk, by Mr. Mack.

The next account of it we have is by Mr. J. F. Stephens in his "Illustrations of British Entomology" published in 1828, as follows "I have seen very few specimens, and until the last season, only three recent captures had come to my knowledge. The first of these was found in August, 1811, at Wrentham in Suffolk by the able artist (C. M. Curtis), to whose pencil I am indebted for the figures with which this work is embellished, and is in his brother's (John Curtis) collection. The second specimen was taken in Epping Forest, in June, 1819, and the third subsequently at Brighton; but last season many

specimens were captured near the last named place, by a person residing in that town."

In 1829, John Curtis wrote in his "British Entomology": "This rare insect is generally found near the coast, especially of Suffolk, Kent, and Sussex, from the beginning of August to the first week in September."

In 1831, the Rev. W. T. Bree writes in the "Magazine of Natural History" "*Colias hyale* appears to be a maritime fly, occurring almost exclusively near the sea coast. Mr. Le Plastrier possesses a beautiful series of specimens of this rare insect, taken chiefly, if not entirely, near Dover."

In 1835, it was quite common in the South-Eastern counties, and a single specimen was taken near Ross in Herefordshire, which appears to have been the first observed west of Surrey. *Edusa* was also common in 1835.

In 1842, the Rev. W. T. Bree writes in the "Zoologist": "The summer of 1842 was one of the finest we have had for many years, and therefore favourable to the production of insects; but what strikes me as strange is, that the same season which produced *Hyale* in more than usual numbers, should not have been equally productive of the allied species, *Edusa*."

In 1842, *Hyale* occurred abundantly in the Eastern and Southern counties, and specimens were taken as far North as York, and as far West as Wilton in Wiltshire, and the Isle of Wight.

In the "Entomologist" for 1842, J. F. Stephens writes, "Of *Colias hyale*, which seems to prefer chalky districts, and to make its appearance after a fine and hot summer; I saw seven specimens in a deep chalk-pit on the Southern side of the down, near Guildford."

In the same volume, Mr. Thomas Desvignes writes, "You may safely state that it only appears every seven years (perhaps one or two may be seen in the interim.) Ever since I took them near Brighton in 1835, I foretold that it would taken in 1842, which turns out to be true. The time of its appearance is from the 15th of August, to the middle of September, but I recollect seeing some specimens that were taken in June, by Le Plastrier at Dover. They are very much pursued by *Pieris brassicae*, which appear to be continually tormenting them, seldom allowing them to settle; and should they survive the day, the following day they are very much worn, and the wings chipped. I have watched two males fighting and soaring in the air till nearly out of sight. They invariably settle on the flower of the lucerne, on which I should say they deposit their eggs, and which have been introduced into this country with the seed originally imported from Switzerland. In 1835, I took fifty specimens in several fields near Brighton, and this year twenty-two in fields in Northamptonshire, probably the most inland county in England where *Hyale* has been captured."

In 1843 and 1844 several of *Hyale* were taken, but more of *Edusa*.

In 1847, both *Hyale* and *Edusa* were taken at Lyme Regis in Dorsetshire.

In 1848, it was only once recorded, as was also *Edusa*.

In 1849, not more than twenty specimens were captured, which entirely broke down the theory of its septennial appearance.

In 1850, it was only once recorded.

In 1855, it was rare but *Edusa* common.

In 1856, a couple were recorded.

In 1857, it was very common in South-Eastern counties as was also *Edusa*.

In 1858, it was again common and *Edusa* also.

In 1859, it was only once recorded but *Edusa* was very common.

In 1865, a few were taken.

In 1867, it was only once recorded.

Now comes the great year 1868, in which it appeared in greater numbers than it has ever done before or since, and a few stragglers were found as far North as Yorkshire and Lancashire, and others at Killarney and Howth, in Ireland.

In the end of July and beginning of August, *Hyale* was the commonest butterfly to be seen at Margate, where the specimens were flying by hundreds. It was a lovely sight to see these handsome creatures settled on flowers, and swaying to and fro in the wind: the rich gold colour of their under-side contrasting beautifully with the purple flower of the lucerne.

"On the gay bosom of some fragrant flower,
They idly fluttering, live their little hour,
Their life all pleasure, and their task all play,
All spring their age, and sunshine all their day."

Mrs. Barbauld.

Hyale was abundant all over the Isle of Thanet, wherever a little patch of lucerne was to be seen, it was sure to be there, even close to the houses. It also appeared that year in great abundance at Gravesend, Colchester in Essex, Cromer in Norfolk, the Isle of Wight, and all along the coasts of Kent and Sussex. A few specimens were taken as late as the 24th September, between Faversham and Canterbury.

In 1869, one was taken in the New Forest, and in 1870 it was scarce, as was also *Edusa*, although it was a fine dry year.

In 1872, the great year for *Antiopa*, *Hyale* occurred commonly on the Sussex and Kentish coasts, but not *Edusa*.

In 1873 and 1874, it was very scarce.

In 1875, *Hyale* was very common again, and several were taken in May and June, being apparently the first year in which the spring-brood has been observed in England. Some specimens were taken as far inland as Birming-

ham. In Suffolk, Essex, and Kent, it appeared in greater abundance than it has done since 1868. *Edusa* was also very common in 1875.

In 1876, both species were common again, and I took a specimen of *Hyle* near Sherborne, being the only one I ever saw alive. This I record as showing how scarce a species it is in the West of England.

In 1877, the year in which *Edusa* appeared in its greatest profusion; very few specimens of *Hyle* were seen, and since then only a couple have been recorded, one in 1881, and the other in 1885.

Family LYCÆNIDÆ.

This is a very extensive family of small, but extremely beautiful butterflies, the European representatives of which are known by the names of Hair streaks, Coppers, and Blues; the former from the peculiar slender hair-like lines on the under surface of the wings; the two latter from the prevailing colour of the upper surface. It is divided into about forty genera, which include fully 1200 species, being nearly nearly twice the number known thirty years ago. Many of the East Indian and American species, far outstrip the European in the brilliancy of their colours.

"Dipt in the richest tincture of the skies,
Where light disports in ever mingling dyes,
While every beam new transient colour flings,
Colours that change when'er they wave their wings."

Pope.

In the chrysalis state, this family bears a close resemblance to the *Papilionidæ* and *Pieridæ*, not only by being attached by the tail, but also by being supported with a belt of silk, which passes round the middle of the body, and is firmly fixed on each side.

The caterpillars somewhat resemble woodlice, and are termed onisciformes.

GENUS VIII. THECLA.

Fabricius.

Thecla, a Virgin and Martyr. Butler's lives of the Saints, ix. 286.

Thecla is a genus of which between five and six hundred species are now described. Its head-quarters appear to be America, where more than nine-tenths of the species occur. In Brazil are some of the largest and most brilliant species of the family. A few are found in Asia and Africa, nine or ten in Europe, of which five are British. Most of the species possess tails to the hind-wings, in that respect resembling those of the genus *Papilio*.

Many of them have one or more fine lines across the underside of the wings, whence arises the name "Hair streaks." A curious characteristic of the genus is, that the members of one sex often have a satin or plush-like patch on the fore-wings, at the extremity of the discoidal cell. The caterpillars appear to frequent trees and shrubs instead of herbaceous plants, as is the custom with those of the allied genera; and the perfect insects are enabled, by their robust structure, to fly with great power over the branches of even the highest oaks and other forest trees.

Writers have divided this genus into two or three sub-genera. Dalman separated those species in which the males have a velvety patch on the fore-wings, under the name *Zephyrus*. This arrangement is followed by Kirby, in his "Catalogue of Diurnal Lepidoptera." Hubner, however, had made the same division at an earlier date, and had still further divided the group. Those in which the males had a velvety patch on the fore-wings, he called *Bithys*; those without a patch, *Strymon*; and the tail-less species he called *Lycus*. To those who study British insects only, this sub-division may appear unnecessary, but the advantage is very apparent when we consider the large number of species. Each sub-genus has its British representative, as will be seen.

SUB-GENUS BITHYS, Hubner.

ZEPHYRUS, Dalman.

Females with a more or less velvety patch on the fore-wings.

ZEPHYRUS is a bad generic name, being the specific name of one of the *Polyommata*.

THECLA BETULÆ.

Brown Hair-streak.

BETULÆ, Linn. *Bet'ulæ*, from the generic name of one of its food-plants the birch, *Betula alba*.

This is the largest species of the genus found in Europe, measuring sometimes an inch and two-thirds in expanse. The sexes differ considerably on the upper side, the male being of a deep brown colour, slightly paler near the centre of the fore-wings, whilst the female possesses on the front wings a large patch of clear orange. Both sexes have several orange marks upon the lower angles of the hind-wings. On the underside the general colour is a tawny orange with duller bands, and marked with one white line on the fore-wings and two parallel white lines on the hind-wings.

This butterfly is later on the wing than any other species of the genus. The earliest specimens emerge in the end of July, and they continue to appear for some time, remaining out till September or even October.

The eggs are white, and are somewhat like those of *Quercus*. They are attached to the twigs of the food-plant, and do not hatch before the spring.

The caterpillar is of a bright apple-green, with pale yellow lines and two rows of oblique streaks of the same colour. It feeds on blackthorn, birch, and alder in May and June.

The chrysalis is short, obese, and of a clear red-brown colour.

Three species of Hymenopterus parasites, belonging to the family Ichneumonidæ, have been bred from *Thecla betulæ*, viz.: *Agrypon flaveolatum*, *Campoplex pugillater*, and *Campoplex eurynotus*.

Thecla betulæ has not a wide range, but occurs in Central Europe, and the South of Russia. It also extends into the Southern parts of Siberia and the valley of the Amoor.

It has not been noticed in the Isle of Man, nor in Scotland, but is very common in the lanes and road-side hedges in the South and West of Ireland in August, frequenting the flowers of the bramble, and settling the moment the sun is obscured. It has not been observed in either Ulster or Leinster. In England it is very widely distributed, being most common in the counties of Devonshire, Lancashire, Essex, and Cambridgeshire. It appears to be entirely absent in the North-Eastern portion, not occurring in Yorkshire, Durham, nor Northumberland, and seems to have become extinct in the counties of Dorsetshire and Norfolk.

The first specimen recorded in England appears to have been taken at Croydon, by the Rev. John Ray, on August 31st, 1702.

Eleazer Albin, in 1720, writes thus, "The caterpillar is of a light sea green colour. It was taken near Hornsey Wood, on the 8th of June; it tied itself up after the manner of the White Butterflies, and on the 16th of July came forth the Hair-streak Butterfly. This caterpillar is very rare and scarce to be met with."

Lewin, in 1795, writes, "This insect is very far from common, but the fly may be taken on the tops of hedges, and particularly on the maple tree, on which it delights to settle. The caterpillars are very singular in their form, and at first sight appear like woodlice, lying flat on a leaf or twig, without the least sign of feet; and when they travel their motion is more like that of a slug than that of a caterpillar."

Haworth, in 1803, records it as being rare.

Stephens, in 1828, writes "Coombe and Darenth Woods are its chief residences near London, but it cannot be esteemed a common species anywhere."

Curtis adds, "It has also been taken in Norfolk, Suffolk, Devon, Dorset, &c."

None appear to have been taken in Dorsetshire since 1842.

THECLA QUERCUS.

Purple Hair-streak.

QUERCUS, Linn. Quer'cus, from the generic name of its food-plant, the oak (*Quercus Robur.*)

This species varies in the expanse of its wings from about an inch and a quarter to an inch and a half. The sexes differ considerably on the upper side, the male being entirely of a blackish brown above, with a purplish gloss; whilst the female possesses on the front wings a purplish blue blotch towards the base. On the underside, the wings are of an ash colour, with a distinct white line running across them, and with a couple of orange dots at the inner corner of the hind wings.

The egg is of the shape common to the family, only larger than that of any of our Blues. It is round in outline, flattened, and with the exception of a central depression on the upper surface, covered with irregular oblong reticulation, and the egg looks quite like a rough *Echinus* in miniature. The shell under the reticulation apparently has a very pale pinkish brown tinge: the lines of the reticulation are white (Rev. J. Hellins). The eggs are laid on the twigs of the oak in August, and remain firmly glued to them throughout the winter.

The caterpillar, which feeds on the oak in May and June, is reddish-brown, covered with short hairs, and with several rows of dark greenish lines or dots. It is short and obese, and in appearance resembles a woodlouse.

The chrysalis is ferruginous, with three dorsal rows of brown dots. In changing to the chrysalis state, the caterpillar spins a few threads, making a frail sort of cocoon just on or just below the surface of the earth, or availing itself of the shelter of a fallen leaf.

This is at once the commonest and the handsomest of the Hair-streaks, being found in every part of England, where there is an oak wood, and looking like a small Purple Emperor, with its rich gloss of the imperial purple. It is also common in Ireland; but in Scotland it is a very local species, not occurring in the Northern or North-eastern counties. On the Continent it is generally distributed, except in the North and extreme South, and its range extends into Asia Minor. The butterfly is seen in July and August, flitting about in sportive groups round oak and ash trees, and occasionally descending within reach of the net.

The Rev. John Ray, in his "Historia Insectorum," mentions that "he took a pair sitting on nettles at Croydon, on the 8th of July, 1692, and that the caterpillar is very similar to a woodlouse."

SUB-GENUS STRYMON.

Hubner.

Females with no velvety patch on the fore-wing.

THECLA W-ALBUM.

Black Hair-streak.

W-ALBUM, Knoch. W-al'bum, on account of the white W on the underwings.

This species averages about an inch and a half in the expansion of its wings.

This is very much like the next in appearance. On the upper side it is a very dark brown, almost black, with an orange spot at the anal angle of the hind-wings, often very indistinct. On the under side it is of an ashy brown, with a row of orange lunules at the hind margins, most distinct at the anal angles. A white hair-like line crosses both wings, and forms a W near the inner margin of each. This last character will at once distinguish it from the next species, *Pruni*.

The eggs are laid on the twigs of the elm and wych elm in July and August, and in shape are somewhat like an orange, but are more depressed on the crown; they are of a whitish colour, and remain firmly glued to the rind of the twigs throughout the winter (Newman.)

The caterpillar is pale green, with short brownish oblique streaks on the side, sometimes with two rows of red spots down the back, and a dull red stripe on each side above the feet. The head is dark brown and retractile, and the body is covered with soft delicate hair. It feeds on elm, wych elm, and also blackthorn in May and June.

The chrysalis is short and obese, ferruginous, with three dorsal rows of brown dots.

An ichneumon fly, viz. *Perilitus scutellata* had been bred from it.

The butterfly appears at the end of June or in July, and continues on the wing till August.

It is found in Central and Southern Europe, and Northern and Western Asia; but seems to be everywhere confined to very restricted localities, and to be of somewhat uncertain appearance.

It is unknown in Ireland, Scotland, and the Isle of Man. In England it is widely but not generally distributed, and does not occur north of Yorkshire; nor is it found in Wales, or the South-western counties.

The first to record it as a British species appears to be Lewin, who in his "Insects of Great Britain," writes thus, "This butterfly is not common.

is first seen out on the wing about the middle of July, and is then sometimes to be seen flying about the bramble blossoms, and frequently settling on them to feed, when it may easily be taken."

In his "Illustrations of British Entomology," J. F. Stephens writes thus, "This species is usually esteemed a scarce insect in the neighbourhood of London, and previously to the last season I never saw it alive; but the boundless profusion with which the hedges, for miles, in the vicinity of Ripley, were enlivened by the myriads that hovered over every flower and bramble blossom, last July, exceeded anything of the kind I have ever witnessed. Some notion of their numbers may be formed, when I mention that I captured, without moving from the spot, nearly 200 specimens in less than half-an-hour, as they successively approached the bramble bush where I had taken up my position. How to account for their prodigious numbers I am perfectly unable, as the same fields and hedges had been carefully explored by me at the same and different periods of the year for several preceding seasons, without the occurrence of a single specimen in either of its stages; and it is worthy of remark that the hedges to the north and north-west of the town were perfectly free, although the brambles, &c., were in plenty. A few specimens were also taken near Windsor, and in Cambridgeshire, and I believe, near Ipswich, during the past season. The entomologists of this last town, Mr. Kirby informs me, do not esteem it a scarce insect; its usual time of appearance is the end of June, and it continues till the middle of July." In the "Zoologist" for 1847, Mr. Stephen adds, "Although I frequented the same locality for thirteen years subsequently; sometimes in the season, for a month together, I have not seen a single specimen there; but in 1833, I caught one specimen at Madingly Wood, near Cambridge."

"In 1829 or 1830," so writes the Rev. C. S. Bird, "this insect appeared in the greatest profusion in my own garden, at Burghfield, near Reading."

It has also been obtained at Melton Wood, near Doncaster, in Yorkshire; Ashton and Barnwell Wolds, in Northamptonshire; Stilton, in Huntingdonshire; New Forest, Hampshire; Allesley, in Warwickshire; and in the neighbourhood of Bristol.

In 1873, it appeared in great abundance in Savenoke Forest.

THECLA PRUNI.

Dark Hairstreak.

Pruni, Linn. Pru'ni, from the generic name of its food-plant, the Black-thorn, *Prunus spinosus*.

This species averages about an inch and a quarter in the expansion of its wings. On the upper side it is a very dark brown, sometimes almost black, and has near the hinder edge of the hind-wing a few orange spots. This last character will at once distinguish it from the previous species, *W-album*. On the underside it is an ashy grey, and has a broad band of orange, with a row of black spots on its inner edge, and a silvery blue line.

The caterpillar is green, with oblique yellow lines on the sides, and dark marks down the back. It feeds on blackthorn in May.

The chrysalis is brown, obese, with lighter markings, and darker tubercles.

The butterfly emerges at the end of June or July, and frequents woods in Central Europe, France, Italy, Scandinavia, Dalmatia, and the mountainous districts of Western Siberia. In this country it is confined to very few counties: Huntingdonshire, Northamptonshire, Buckinghamshire, Derbyshire, and the extreme south of Yorkshire.

It was not known to be a British species until September 1828, when a member of the Entomological Club, purchased a number of specimens from a Mr. Seaman, then a well-known dealer in objects of natural history, and resident at Ipswich. The purchase was made under the impression that the butterflies were the Black Hair-streak (*W-album*), then a desirable insect to obtain. Seaman, unconscious of the value of his capture, had given the real and familiar locality of Monk's Wood, in Huntingdonshire, as the habitat, but as soon as it was known that the butterflies were not the Black Hair-streak at all, but a species new to Britain, he determined to move the mine of wealth to Yorkshire; and Mr. Curtis, who shortly afterwards published the butterfly under its correct name, gave Yorkshire as the county where it had been found.

In an appendix to his "Illustrations of British Entomology," 1834, Mr. Stephens writes, "The insect occurs in profusion in Monk's Woods, Hunts., towards the end of June, at which period it was taken by C. C. Babington, Esq., and in the beginning of July I had the pleasure of capturing it there myself."

In 1832, several were taken by Mr. Henderson, in Melton Wood, near Doncaster.

In 1837, my father met with it as late as the 17th of July; and in 1842, Mr. Doubleday as early as the 18th of June.

In the *Zoologist* for 1852, the Rev. W. Bree writes, "*Thecla pruni* is very uncertain in its appearance. In 1837, it literally swarmed in Barnwell and Ashton Wolds, Northamptonshire. I do not scruple to say that it would have been possible to capture some hundreds of them, had one been so disposed; for the last few years it has appeared very sparingly indeed."

In the "Weekly Intelligence" for 1858, Mr. Sturges writes, "In a box of insects captured within a few miles of Chesterfield I find this very local species."

In the "Entomologist" for 1874, Mr. Thompson writes, "*Thecla pruni* in Buckinghamshire. On the 4th July, being at Linford Woods, I captured several specimens of *Thecla pruni*, on flowers of the privet, mostly females."

SUB-GENUS LYCUS.

Hubner.

Species without the small tail on the hind-wings, and the streak on the underside wanting or less distinct.

THECLA RUBI.

Green Hair-streak.

RUBI, Linn. Ru'bi, named after the bramble (*Rubus fruticosus*), on which it was formerly supposed to feed.

This may be easily distinguished from all other of our British butterflies by the green colour of the underside; and from the other Hair-streaks by possessing no tails. The colour of the upperside is brown, and the wings expand about an inch and a quarter. The female has occasionally a pale whitish oval dot near the middle of the forewings towards the costa.

The caterpillar is of a yellowish green, with a brown dorsal stripe, and oblique white stripes on the sides, and covered with minute raised points bearing fine short bristles. It feeds on *Genista tinctoria*, and on Broom, in June and July. When about to undergo its change, it enters the earth, but only just beneath the surface.

The chrysalis is short and obese, rather rounded, and of a dark, dull purplish brown colour, covered with short dark brown bristles.

The butterfly appears on the wing in the end of April, and continues out till June. Stray specimens are sometimes met with in July and even in August.

It occurs all over Europe except the Polar regions, North Africa, and Northern and Western Asia, as far as Persia. In California there is a closely allied species—*Dunetaria*, which is, perhaps, only a geographical variety.

It appears to frequent open places in woods, and bushy overgrown land, lanes, &c., and to be generally distributed throughout the British Isles, occurring as far north as Rosshire.

The first English author who appears to have known it was Dr. Merrett, in 1667.

Petiver, in 1702, gives it as occurring in the West of England, Cambridge, and about London.

GENUS IX. CHRYSOPHANUS.

Hubner.

CHRYSOPHANUS, from Chryson—gold, and Phaino—to appear.

The relationship of this genus to the next is unquestionably very close, but the splendid coppery colour of the upper surface of the wings, the naked eyes, and the very spinose feet, seem to warrant their generic separation. There has been a considerable diversity of opinion as to the employment of the generic names of the two groups. Fabricius included both under the name of *LYCÆNA*. Latreille employed the name *POLYOMMATUS* for the whole of the species of the family *LYCÆNIDÆ*, giving one of the Blues as an example of the genus. Stephens employed the name of *LYCÆNA* for the Coppers and of *POLYOMMATUS* for the Blues. On the other hand, Boisduval employed the name of *POLYOMMATUS* for the Coppers and that of *LYCÆNA* for the Blues. But Hubner's name *CHRYSOPHANUS* is far more applicable to the present group, being quite expressive of their splendid appearance.

The species of this genus are for the most part European; a few species are, however, scattered over most parts of the world. The species found in Europe are about fifteen in number, only one of which is to be found in the British Isles at the present day. Another formerly inhabited the fens of Huntingdonshire, and three others have been recorded as British, but apparently upon rather doubtful authority.

CHRYSOPHANUS DISPAR.

Large Copper.

DISPAR, Haworth. Dis'par, unlike; on account of the disparity in appearance of the sexes.

Some years ago, this was the pride of English entomologists, for we were supposed to have a butterfly entirely to ourselves, it being unknown on the Continent, whilst it literally swarmed in some of the fens of Huntingdonshire and Cambridgeshire.

The two sexes differ very remarkably in the appearance of the upperside. This in the male, is of an effulgent coppery colour, with a narrow black hind margin. Above the centre of each fore-wing, are a larger and smaller black spot. Above the centre of each hind-wing, is a black streak. The female has two larger black spots above the centre of each fore-wing, and a row of seven between the centre and the hind margin, which is broader than that of the male. The hind-wings of the females are much suffused with black scales, and have a band of coppery-red near the margin, extending also more or less

distinctly along the courses of the veins. On the underside both sexes are nearly alike, the hind-wings being of a general light blue tint, with black spots, and a red band near the margin; and the fore-wings having a yellowish tinge, with a row of seven black spots between the centre and the hind margin, and another row of three between the middle and the fore margin.

The expanse across the wings varies from one inch and five lines to two inches and two lines. Very few varieties are known. There is a female in my own collection, which is almost entirely black, and a specimen in Mr. Sidebotham's collection seems to approach the variety *Schmidtii* of *Phleas*, having the forewings inclining to silvery towards the hind margin. On the Continent occurs the variety *Rutilus*, which is smaller, and has smaller spots, and is found in France, Germany, and Italy. It has been recorded as British under the name of *Hippothoë*. Concerning this, my father wrote in "Loudon's Magazine," for 1834, "Mr. Haworth told me that they came out of an old cabinet called the Kentish Cabinet, and were said to have been taken near Faversham. I had a male and a female from the late Mr. Latham, which were from Capt. Lindegren's cabinet, whence, probably, all the supposed British specimens came."

The caterpillar is somewhat hairy, bright green, with innumerable white dots. It used to feed on the Great Water Dock (*Rumex hydrolapathum*), and was hatched from the egg in August or September, and hybernating before growing much, reappeared in spring to feed up by May or June.

The chrysalis was at first green, then pale ash-coloured, with a dark dorsal line, and two abbreviated white ones on each side, and lastly sometimes deep brown (Stephens). It was very obese, blunt at both extremities, attached by minute hooks at the caudal extremities, and also by a belt of of silk round the middle (Newman.)

The butterfly used to emerge from the chrysalis state in June and July, the 25th of June being the earliest known date.

Some butterflies of this very rare species, so Lewin, in 1793 informs us in his "Insects of Great Britain," were met with by a gentleman in Huntingdonshire, on a moorish piece of land, and were afterwards sent to Mr. Seymer, F.L.S., of Dorsetshire, who presented them to the late Duchess Dowager of Portland.

Haworth, in 1803, informs us in his "Lepidoptera Britannica," that the butterfly in July frequents the marshes of Cambridgeshire in certain but undeterminable years. That it is a new and very beautiful species to England, lately detected by himself and his very dear friends W. Skrimshire and F. Skrimshire, M.D., and formerly in Wales by the celebrated botanist Hudson; but nowhere in Scotland, as Donovan hath said from erroneous information.

Mr. William Hudson, on the institution of the British Museum, in 1756, was made one of the assistant librarians. He resigned this office, however, in 1758, in order to pursue his profession as an apothecary. In 1762, he published his well-known work "*Flora Anglica*," in which the indigenous plants of England were arranged according to the Linnæan system, and he was soon after made a Fellow of the Royal Society. In 1778, was published a second and improved edition.

The Messrs. Skrimshire first saw the Coppers as they going to Ely in a gig in 1797 or 1798, but took little notice. On returning they saw one settle on the road, and they knew it was not a common one.

The next specimens were taken at Whittlesea Mere, by Thomas Speechley, an old boatman in my father's employ, in July, 1819, and subsequently by my father himself and the Messrs. Standish. It appears to have occurred in great plenty, as several hundreds were taken within the next ten years by the London collectors, who visited Whittlesea and Yaxley Meres, during the month of July, for the sole purpose of obtaining specimens. In 1827, Mr. Haworth took fifty specimens in a single day in Bardolph Fen, Norfolk; a few also were taken at Benacre, in Suffolk.

In Loudon's "*Natural History*" for 1834, is the following fact communicated to the Rev. W. T. Bree, by Mr. Haworth. "Some entomologists once made an excursion into the fens, for the purpose of taking the beautiful *Lycæna dispar* or Large Copper butterfly, which it is well known frequents low marshy grounds. The Coppers were captured in great abundance. It so happened that the following winter proved to be a very wet one, and the entire tract of land where the Coppers had been found was completely inundated, and actually lay under water for a considerable time. The entomologists deemed that the flood would certainly destroy the Coppers, and that the race would become extinct in that part of the country. The next summer, however, the butterflies were found again on the very same spot, as plentifully as before. Subsequently the tract of land was submitted to the action of fire, and the whole surface burnt with a view to agricultural improvement. After this operation, the Coppers were no longer met with in that particular locality." The latest capture, consisting of five specimens, appears to have been made at Holme Fen, by Mr. Stretton either in 1847 or 1848.

In 1851, Whittlesea Mere was drained, and what was once the home of many a rare bird and insect, became first a dry surface of hardened mud, cracked by the sun's heat into multitudinous fissures, and now scarce yields to any land in England, in the weight of its golden harvest.

In the "*Introduction to Entomology*" by Kirby and Spence, published in 1826, is the following passage, "Morasses also have their peculiar insects.

In this kind of district in the Isle of Ely, has been taken that scarce and beautiful butterfly *Lycæna virgaurea*," by a Fellow of Trinity College, Cambridge. Donovan also states one was taken in Cambridgeshire, and *Papilio virgaurea* and *Papilio hippothoe* (meaning *Dispar*), have been frequently confounded with each other; but on a comparison, a material difference will be discovered. Moses Harris has figured *Phlæas* under the name of *Virgaurea*, but he was misled by Linnæus, who referred a description of Ray's, to *Virgaurea* instead of *Phlæas*.

CHRYSOPHANUS HIPPOTHOE.

Purple-edged Copper.

HIPOTHOE, Linn. Hippo'thoë, the mother of Taphius, of the race of Perseus.

There has existed a certain amount of confusion, concerning the name of the present species. Fabricius thinking Linnæus' description applied to *Dispar*, named the present species *Chryseis*. But the specimen in the Linnæan cabinet is not *Dispar*, but the *Chryseis* of Fabricius.

In the "Pinax rerum Naturalium Britannicarum" of Dr. Christopher Merrett, published at London in 1667, is the following description of a butterfly, "Cum externis coccineis externis purpurascentibus." Mr. Haworth observes in his "Review of Entomology" published in the "Transactions of the Entomological Society" for 1812, "That Merrett should have been acquainted with *Papilio chryseis*, the Purple-edged Copper as British is indeed singular, but his words 'externis purpurascentibus,' by which I understood 'externis marginibus,' &c., absolutely and pointedly agree with it, and as absolutely and pointedly disagree with every other known British species."

The next account of it we have is in "Sowerby's British Miscellany, published in 1806, as follows, "This new British *Papilio* was caught by Mr. Plasted, of Chelsea, in Ashdown Forest, Sussex."

It may perhaps be asked, What other species did Mr. Plasted take? Why! *Satyrus hero* and *arcanius*, in Ashdown Forest; *Acontia catena*, at Brixton; and *Acontia caloris*, in the neighbourhood of London.

In his "British Entomology" Curtis wrote, "*Chryseis* was abundant in August and September, 1818, at Woodside, near Epping."

In his "Illustrations of British Entomology" Stephens wrote, "Dr. Leach received fine and recent specimens from the vicinity of Epping, for several successive seasons." Probably they were from the same person, supposed to be a dealer, who is said to have taken *Calophasia linariæ* in June, 1817, at Woodside, near Epping.

It is a common species throughout a great part of Europe and Western Asia, from June to August, though somewhat local, frequenting damp meadows near woods, and in the mountains.

CHRY SOPHANUS PHLŒAS.

Small Copper.

PHLŒAS, Linn. Phlœ'as, a surname of Venus, perhaps derived from *flos* bloom.

The sexes of this lively little representative of the genus resemble each other closely, and also the female of *Dispar* on the upperside, the hind-wings however, are much blacker, and there are three lilac dots on each. On the underside, the hind-wings are of an ashy brown. The expanse varies from eleven lines to one inch and four lines.

It is a very variable species, and the ground colour varies from the bright copper of the type through paler yellow to perfectly pure silvery white, which variety is called *Schmidtii*. In the other direction, it varies by the fore-wing being suffused with dark scales until they nearly resemble the hind-wings. Mr. Stephens in his "Illustrations" give the following varieties.

Var. *b.* has the fore-wings of a deep dusky copper, with very large nearly confluent spots; the hind-wings with a very narrow waved band.

Var. *c.* has the forewings of a pale rufous copper, with the spots very small, and several of the inner ones obliterated.

Var. *d.* has the hindwings more or less spotted with blue towards the coppery band.

Var. *e.* has the hind-wings with faint radiating coppery lines, as in the female of *Dispar*.

Var. *f.* has the hind-wings wholly of a dusky colour, without the cupreus marginal fascia.

Var. *g.* has the disc of the wings pure white; but the wings are spotted and bordered as in the type.

The Southern variety *Tineus*, Cranes, is very much darker than the type, and has short tails to the hind-wings.

Other named varieties are *Chinensis*, occurring at Shanghai; *Pseudophlœas*, from Abyssinia; *Americana*, from Massachusetts, and *Hypophlœas*, from California.

The egg is large for the size of the butterfly. It is circular, rather flattened, of a light cream colour, and very coarsely reticulated with whitish raised net work.—Buckler.

The caterpillar is green, and has a deep red dorsal stripe and a pale red mark along the side, where it projects over the legs. Sometimes it is paler and without the red markings. It feeds on various species of dock and sorrel (*Rumex*.)

The chylalis is of a light brown, very much freckled with darker brown. It is very thick and dumpy, much resembling that of *Lycæna*.

There appears to be three broods of this resplendent little butterfly in the year. It appears first on the wing in April or May; the eggs then deposited hatch in about ten days, and the caterpillars feed up in about three weeks; they remain ten or twelve days in the chrysalis state, and the butterfly is on the wing again by the end of June. The same relative periods may be taken with the third brood, the butterflies of which appear in September, and continue on the wing sometimes as late as the 8th of November, flashing about in the sunshine, or settling on the yellow flowers of the *Inula* or Ragwort, or on the lilac blossoms of the Scabious, whose soft tones set off to the best advantage the metallic effulgence of this little gem. The caterpillars from this last brood hibernate when small, and reappear early the following spring.

Phleas has a very extensive range, and is abundant throughout Europe, except the extreme North, in North Africa from the Canary Islands to Abyssinia, Northern and Western Asia to the Himalayas, and even over the greater part of North America, one form of it extending as far South as Venezuela.

It is also an abundant species throughout the British Isles, except the extreme North.

It is described in Ray's "Historia Insectorum," 1710.

GENUS X. POLYOMMATUS.

Latreille.

POLYOM'MATUS, many eyed, in allusion to the numerous eye-like spots on the under surface of the wings.

This is a very large genus, embracing between three and four hundred species, distributed all over the world, but least numerous in South America. One species, *Parrhasioides*, is as yet the only butterfly known from the Galapagos Islands, and another, *Franklinii*, is found high up in the Arctic Regions. One species, *Trochilius*, is the smallest of our European butterflies, measuring not more than half-an-inch across the wings. Small as all the European Blues are, few of the tropical ones surpass them in size or in beauty; and the largest known species, *Pyreri*, a native of Japan, is not more than a couple of inches across the wings, being thus only slightly larger than our

English species *Arion*: About 50 species inhabit Europe, of which ten have been taken in Britain.

The characters of the genus may be thus described: Antennæ slender, club thick, not gradually formed like that of *Thecla*; palpi rather long; eyes sometimes hairy, sometimes naked; wings very seldom with tails, those of the male generally blue; those of female generally brown.

The caterpillars of all our British species, with the exception of *Argiolus*, feed on papilionaceous, and various other low plants.

Dr. Horsfield in the "Lepidoptera Javanica," divided the genus *Polyommatus* into two sub-genera, the first named *Pithecopis*, from the peculiar aspect of the chrysalis. This sub-genus is represented in the British Fauna by *T. alsus*. The sub-genus *Polyommatus*, is characterised by Dr. Horsfield as having the margins of the hind-wings with the anal extremity angular, and produced to a short, rounded point. Mr. Stephens, in his catalogue, adopts these two sub-genera as sections, giving *Argiolus* and *Acis*, as well as *Alsus*, as belonging to *Pithecopis*. Dr. Horsfield, however, gives *Alsus* expressly as the European type of *Pithecopis*, which he characterises by the comparative narrowness of the wings, and it also possesses a peculiarity in the arrangement of the veins of the fore-wings. *Argiolus*, on the contrary, has broader wings than any other European species, and of a stronger texture. Ochsenheimer divided the genus artificially into two sections, according to the presence or want of a row of fulvous spots within the hind-margin of the hind-wings.

A few species have pale transverse lines on the underside; these and one or two others, have short and slender tails to the hind-wings. These Hübner placed in his genus *Lampides*.

SUB-GENUS—LAMPIDES.

Hübner.

Hind-wings with short and slender tails.

Most of the species of this sub-genus are found in Asia and the Asiatic Islands, and only four in Europe.

POLYOMMATUS BÆTICUS.

Long-tailed Blue.

BÆTICUS, Linn. Bæ'ticus, from Bætica, as the Southern portion of Spain was called in the days of the Roman Empire.

This little stranger somewhat resembles the Common Blue on the upperside, but may at once be recognized by the long, tail-like appendages to the hind-wings. The underside is totally distinct from that of any of our native Blues, being of a plain brown with numerous nearly straight white streaks, and two spots of glittering metallic green, reminding one on a small scale, of the "eye" of a peacock's feather. On the upperside the male is of a violet blue, with two black spots at the anal angle of the hind-wings; but the female is blue only at the base of the fore-wings, and the inner margin of the hind-wings, the prevailing colour being brown.

The expansion of the wings varies from one inch and a line to an inch and four lines.

The caterpillar feeds on the common pea, and other of the Leguminosæ in June and July, but has not yet been detected in Britain. It is of a green or of a reddish-brown colour, with a dark dorsal streak, and has a lateral line and oblique streaks, of a paler shade than the ground colour.

The chrysalis is attached by a belt of silk round the middle of its body to the stem of its food plant. It is obese and rounded at both extremities; the colour is testaceous yellow or dull red, with brown dots and black spiracles.

The butterfly is on the wing from August to October. It has long been known as a Southern species, with a very wide range of distribution, abounding everywhere in Europe south of the Alps, and all over Africa, Western Asia and the East Indies. It is also found in the Mauritius and the Canary Islands, and in the Island of St. Helena it is the commonest butterfly, being especially fond of a rather high altitude. On the other hand it is scarcely ever found north of the Alps, except in France; though it occasionally extends its range as far as the Channel Islands, where it appeared abundantly in 1859, and has even been met with once or twice on the South coast of England, and three times in Belgium.

It was first taken in this country in the above mentioned year, 1859; one specimen on the 4th August, near Christchurch, Hampshire, by Mr. Latour. Another on the same day at Brighton, by Mr. McArthur, on the downs near the sea, where a third specimen was taken the next day by the same collector. The next specimen was taken at Freshwater, in the Isle of Wight, by Mr. Snell, on the 23rd of August, 1878.

In 1880, Mr. Durham writes to the "Entomologist" "On September 12th, while at Aldwich, near Bognor, Sussex, I went into the garden, shortly after breakfast. I almost immediately saw a specimen of this rare butterfly at rest on a geranium. Having obtained my net, I succeeded in taking it."

In 1882, a specimen was taken at Bournemouth by Miss Staples, on the 2nd October.

POLYOMMATUS ARGIADES.

Bloxworth Blue.

ARGIADES, Pall. Argia'des, perhaps from Argia, wife of Polynices, daughter of Adrastus, King of Argos.

The wings of this—the most recent addition to our by no means large list of British Butterflies, expand a little over an inch. It somewhat resembles *Ægon*, but may be recognized by the little tail-like appendages to the hind-wings. On the upperside, the male is of a lilac blue, with narrow brown borders to all the wings. The female is brown, and has two orange spots at the anal angle of the hind-wings. The underside is of a whitish grey, with a few black spots and two orange spots at the anal angle of the hind-wings.

The caterpillar is of a pale green, with a dark line along the back, and brown and white spots. It feeds on *Lotus corniculatus*, and various species of *Trifolium*, hibernating small and feeding up in the spring.

The discovery of a new butterfly in Britain is an event of considerable interest. Mr. Stainton in 1857, considered that new species of British butterflies were more likely to occur in the genus *Erebia*, than in any other. Events have proved him wrong. As far as we know at the present time, only five specimens of *Argiades* have been taken in England; two by the Rev. O. P. Cambridge, or rather by his sons. These were taken on Bloxworth Heath, near Wareham, in Dorsetshire, on the 19th and 20th of August, 1885. A specimen was also taken near Bournemouth, the same month by Mr. Philip Tudor. Two others have been detected by the Rev. J. S. St. John, of Whatley Rectory, Frome, Somersetshire. These, it appears, were taken eleven years ago, 1874, close by a small quarry not two miles from the Rectory. As it has a co-extensive range with *Adonis* and *Corydon* on the Continent, it is probable that it occupies other exceedingly small holdings in our South-Western counties, than those to which reference has been made.

Abroad it appears to be, generally speaking, a common species, frequenting open flowery places in woods, and mountain meadows in May, and again in August. The spring brood, *Polysperchon*, is much smaller than the summer, and there is a variety, *Corelas*, which has no orange spots.

It is found throughout Central and Southern Europe, except Spain, North-Western Asia, the South of Siberia, and Amurland.

SUB-GENUS—NOMIADES.

Hubner.

The species of this sub-genus differ from the next by the absence of any red or fulvous spots on the underside.

In Britain we possess four species, one of which, *Alsus*, belongs to the sub-genus *Pithecops*, of Dr. Horsfield.

POLYOMMATUS ARGIOLUS.

Azure Blue.

ARGIOLUS, Linn. Argi'olus, diminutive of Argos, a city of Greece.

This Blue has wings of a stronger texture than any other of the European species, and is of entirely different habits, flying over the tops of, and settling on, holly bushes, evergreen oaks, and ivy covered walls and trees, instead of low growing plants, in meadows and on chalk downs.

The male is of a pale blue on the upperside, slightly margined with black. The spring brood of the female much resembles the male, but it has a broad black hind-margin to the fore-wings, and black marginal dots on the hind-wings. The summer brood has the hind-margins of the fore-wings still broader; and the costa of the hind-wings also is broadly black. The underside is of a very silvery blue, with numerous black dots. The width across the wings varies from one inch to one inch and a quarter.

In Persia and the Island of Cyprus a variety, *Hypoleuca*, occurs, which has no spots on the underside.

There are two broods of the butterfly in the year. The first is on the wing the middle of April, to the middle of May; sometimes earlier, as the Rev. W. Bree in "Loudon's Magazine" for 1831, mentions having seen it on the wing as early as March 28th. The caterpillars from this are hatched from the egg in the end of May, and feed on the flowers and young leaves of holly, or young ivy leaves throughout the month of June.

The second brood of butterflies appear in the end of July and in August. The second brood of caterpillars feed in September and October, on the flower buds and young leaves of the ivy; and the winter is passed in the chrysalis state.

The egg is very much like that of the Common Blue, except that it is rather larger, the shell is of a pale bluish green, and its whole surface, with the exception of a central spot, is overlaid with raised white reticulations, having little knobs at the angles.

The caterpillar escapes from it by eating a hole near the centre of the upper surface, and is plump and hairy, with a greenish-white body and dark head; it is very slow in its movements. In about five weeks it is full-fed, and then reaches the length of three-eighths of an inch, covered with unusually long, whitish, soft, silky hair. There appear to be several varieties in colour. One is of a bright yellowish-green, with paler lines; another is of an olive green, strongly marked with crimson on the dorsal region, and along the sides; another is of a dark dull satiny green, with a dark green line along the back; another is of an olivaceous pink or mouse colour. It feeds on the flower buds and young leaves of the holly, ivy, evergreen oak, dogwood, spindle tree, and buckthorn. About four or five days before changing to the chrysalis state, it spins a fine layer of silk as a foothold, and fastens itself to a stalk of its food-plant, by a stout thread of silk round the middle of the body, and two short ones on each side, joining which it forms triple moorings.—Buckler.

The chrysalis is short and obese, smooth, of a green or pale ochreous colour, with brown markings, and a dark dorsal line.

Argiolus is a common but seldom abundant species, in open woods and gardens, throughout Europe except the extreme North, Northern and Western Asia, and North Africa; and very closely allied species are found in the Himalayas and North America.

It is generally distributed throughout England and Ireland, but is apparently absent from Scotland and the Isle of Man.

Ray, in his "Historia Insectorum," published in 1710, gives it as having taken by Petiver in a garden at Enfield. This appears to be the first account of it being taken in England.

Lewin writes in 1795, "They are inhabitants of our woodlands, but are far from being numerous. Flying slowly up and down the avenues of the woods they may be easily taken."

In 1809 and 1810, my father met with it in great plenty at Enborne in Berkshire, during the months of May and June.

In 1835 and 1836, it was very abundant in Suffolk, but in 1841 only a couple were seen.

In 1856, immense quantities were taken in Sutton Park, Warwickshire.

In 1870, several were seen in Dorsetshire, previously only one had been seen at Glanvilles Wootton, and that on the 28th of April, 1827.

In 1882, *Argiolus* was again very common.

In the "Entomologist" for 1886, Mr. Harwood of Colchester writes, "I collected for years in this district without meeting with a single specimen;

it then became common for several seasons, but has been comparatively scarce during the past three or four years."

Although *Argiolus* is double-brooded in the South of England, it appears to be only single-brooded in the North, as in his "Lepidoptera of Northumberland and Durham" Mr. Wailes only records it as occurring in the spring of the year; and the Rev. W. T. Bree writing to "Loudon's Magazine for 1836, states, that he took a specimen on the 28th of August, in his garden at Allesley, near Coventry, in Warwickshire, and that, although the species is for the most part only single-brooded in his part of the country, it it does nevertheless, occasionally, though rarely, produce a second brood during the same season.

POLYOMMATUS ACIS.

Mazarine Blue.

ACIS, W. V. A'cis a young Prince of Sicily, who was in love with the beautiful Galathea, and in despair threw himself into the river, which from that time has borne his name. This species appears to have had the name of *Semiargus* given to it in "Des Naturforscher" a Zoological Miscellany, published at Halle, in 1775. The name of *Acis* was given in the Vienna Catalogue, published in 1776.

Lewin, however, in 1795, called it *Cimon*, giving Linnæus as an authority for the name.

The male is of a dull dark blue, with very narrow blackish-brown hind margin to the wings.

The female is of a dark brown, with a bluish tinge at the base of the wings. The under-side of both sexes are similar, being of a pale greyish-drab, tinged at the base with greenish-blue, and with black spots in white rings.

The width across the wings varies from one inch to one inch and a half.

Five named varieties occur on the mountains of Asia Minor, Mount Parnassus and other Greek mountains. One of them, *Belbi*, has red spots on the underside, and another, *Antiochena*, a form of the female, has a reddish band on the upperside of all the wings.

When flying, *Acis* much resembles *Alexis*, but is darker in colour, of slower flight, and flies more heavily, and at Glanvilles Wootton was formerly the most common.

The caterpillar has never been discovered in England. It is covered with fine yellowish-green hair, and has stripes of a darker shade on the back and sides; the head and feet being of a dark brown. It feeds on *Anthyllis vulneraria* in August and September. (Kirby.)

The butterfly is found from May to August, and inhabits meadows throughout Europe except the extreme North, and its range extends into the Western parts of Asia, as far as Persia.

It has never been met with in Scotland, Ireland, the Isle of Man or the Channel Islands, and in England is an almost, if not quite, extinct species.

The first account we have of its occurrence in England, is in Ray's "Historia Insectorum" published in 1710, as follows. "Alæ supinæ ad exortum cœrulescunt; inferius e fusco albicant. Ocelli sex septemne in singulis alis. A. D. Dale capta nobisque ostensa est."

In 1795, Lewin in his "Insects of Great Britain" writes, "This is a very rare butterfly with us, and therefore it will be readily supposed our knowledge of its natural history is very much confined. The caterpillar is unknown. The last week in August, 1793, I took two or three of the butterflies, flying in a pasture field at the bottom of a hill near Bath. They were much wasted in colour and appeared to have been long on the wing; whence we may safely conclude, that they were first out from the chrysalides about the middle of July."

In 1803, Haworth in his "Lepidoptera Britannica" writes, "Habitat Imago m. Mai. f. Jul. in Cretaceis, rarissima fere omnium nostratum cœruleorum; at nuper capta, et ad me missa, in comitatu Ebor, amicissimo meo P. W. Watson, et etiam in Norfolcia amicissimo meo J. Burrell, M.A."

In 1819, Samouelle in his "Entomologists' Useful Compendium" writes, In Britain it is very local, but it is found near Sherborne in Dorset in great abundance."

In 1828, Stephens in his "Illustrations of British Entomology" writes, "A scarce, or rather local species; found in chalky districts in Norfolk, Cambridge, Yorkshire, and Dorsetshire; also near Brokenhurst and Avesbury, Hants; and on Windlesham Heath, Surrey, towards the end of May and of July." To these localities, Curtis adds Leicestershire, and Coleshill, Warwickshire, and it has also been met with in Lincolnshire, Worcestershire and Monmouthshire.

In Loudon's Magazine for 1833, the Rev. W. T. Bree writes, "*Acis* was at one time considered to be an insect of very great variety. In 1803, Haworth spoke of it as the rarest, perhaps, of our British Blues. Since that period, the species has turned up in a variety of situations. Though by no means common, it appears to be widely distributed; nor is it peculiar to chalk districts; but seems to delight in woody situations abounding in grass. Probably it may be overlooked on the wing, and passed by for the Common Blue."

It was common at Glanvilles Wootton, in Dorsetshire, in 1808, once recorded in 1811, once in 1812, common in 1813, 1814, 1815 (one being taken as late as August 1st), and 1816, scarce in 1817 and 1818, common in 1819, 1820, and 1821, scarce in 1822 and 1823, common in 1825 twenty specimens being taken by my father on the 13th June, scarce in 1828, 1830, and 1831, common in 1834 and 1835, one only seen in 1836, a few in 1837, none recorded in 1838, scarce in 1839 and 1840, and in 1841 a pair on the 19th June, being the last ever seen in Dorsetshire. From J. C. Dale's Entomological Journal.

In Cambridgeshire, the last specimen appears to have been taken on 28th July, 1858, and in Gloucestershire, July, 1849. In Glamorganshire, it could be taken in plenty in 1835, 1836, and 1837; a few were also taken in that county in 1871, 1874, and 1875, twelve specimens in 1876, and two in 1877. At Tenby, in Pembrokeshire, one was taken by Mr. Edwards, flying over thyme, in 1883. This appears to be the last specimen taken in the British Isles.

POLYOMMATUS ALSUS.

Little Blue.

ALSUS, W.V. *Al'sus*, a Rutulian shepherd, Virg. *Æneid.* xii. 304.

This was named *Minima* by Fuessli in 1775, but Fabricius recognizing the absurdity of the name, adopted that of *Alsus*, given in the Vienna Catalogue, published in 1776. *Trochilius*, not *Alsus*, is the smallest of the European butterflies.

Both sexes are of a dull brown on the upperside, the male with, the female without, a silvery blue tinge. The underside much resembles that of *Acis*.

The width across the wings varies from three-quarters of an inch to an inch.

Very few varieties are known. I once saw an albino taken at Winchester, and a variety, *Lorquinii*, which is sky blue on the upperside, is found on the Continent.

The egg, as might be expected, is very small, round, but more flat than globular, with a central depression on the upper surface; the depression is the only place where the pale green ground colour of the egg can be well seen, because the rest of it is closely covered with a raised white network. It is generally deposited low down on the calyx of the flowers of *Anthyllis vulneraria*; on the flowers and seeds of which plant the caterpillar feeds.

The caterpillar is a very tiny little fellow on emerging from the egg, and is of a whitish-green colour with a black head. After a time the colour changes

to a pinkish-brown or a chocolate, and finally to a greenish-yellow, with reddish-brown dorsal and lateral streaks, the skin being covered with short bristles of a darkish brown. When full grown it is about one-third of an inch long, and may be compared to a very tiny tortoise, the head being very small and retractile, and a lateral ridge running all round, and giving the appearance of an upper shell.

The chrysalis is obese, of a brownish-yellow with three rows of black spots. It does not appear to be suspended by the tail and by a girdle of silk, as is the custom of the family, and when found on a chalky soil, can well be passed over as a stony particle.

There appears to be two broods of the butterfly in the year, at least in the South of England, one in May and June, and the others in August. Perhaps the second brood does not always appear, as the Rev. J. Hellins writes to the "Entomological Monthly Magazine," Vol. 10. thus, "Egg laid about middle of June; caterpillar hatched within a week, full-fed, and fixed motionless about the end of July, so continuing ten months till the beginning of next June; the chrysalis state then lasting some ten days or so, and the butterfly, apparently, living but a short time to perpetuate the species. The long continuance in the caterpillar state, after being full-fed, seems very remarkable."

This little butterfly is generally distributed over Europe except in the extreme North, and occurs also in Siberia and Asia Minor. It is chiefly confined to chalk and limestone districts, and rather local though occurring in almost every county in England, and is common in many places in both Ireland and Scotland, Forres being its northernmost limit.

Lewin appears to have been the first to have taken it in England, for in his "Insects of Great Britain," 1795, he writes thus, "This very small butterfly passed unnoticed a number of years. Its flight is quick, and being so very minute, it is lost to the sight in a moment. It is far from uncommon, as I have taken it in various places flying the first week in June. It frequents the sides of hedges on a chalky soil. The caterpillar is not likely to be seen, as it must be very small; and we may safely suppose, that it feeds on grass. The male and female differ only in size."

Stephens in 1828, records it as "not a very abundant species."

POLYOMMATUS ARION.

Large Blue.

ARION, Linn. Ari'on, a Lyric poet of the Island of Lesbos, and a skilful player upon the lute.

The upperside is of a deep dark blue, with black hind-margins, and granulated with black scales, giving it a dull appearance. There is a black central spot on the fore-wing, and four spots or more between it and the hind-margin. The female differs from the male by having the spots of a larger size, and wedge shape, instead of being round as are those of the male. The underside is of silvery gray with a blue tinge near the base of the wings, and has many black spots in white rings.

The expansion of the wings varies from one inch and five lines, to one inch and eight lines.

Var. *b.* (*Alcon*, Steph.) is of a brownish ash colour on the underside, and has the spots rather indistinct. Stephens records it as being in the collection of Mr. Haworth, and that it was captured in Buckinghamshire, by Mr. Jones, known by his paper on the neuration of the wings of the Linnæan *Papilions*. After Mr. Haworth's death, it was bought at the sale of his effects, by Mr. Dale. Other examples exist in various other collections.

Another variety, *Cyanecula*, occurs in North-Eastern Siberia.

The egg is round, smooth, and depressed on the top, and of a pale greenish-blue colour. It is covered with fine raised transparent white reticulation.

The caterpillar is a stout little fellow, but tapering towards the head. At first it is of a dull green colour, but afterwards turns to a pinkish-brown, the body being sparingly clothed with light brown hair. When young it feeds on the flowers of *Thymus serpyllum*, but in captivity always dies before changing to a chrysalis.

Arion is generally distributed over Europe, and the North and West of Asia. In Germany it haunts the lofty fir forests, where the ground is clothed with bilberry, moss, and straggling plants of wild thyme, and is to be met with throughout the month of July. In Silesia, though, Professor Zeller found it plentifully in the moist open meadows at the foot of Mount Hochwald. It has never been met with in Ireland, Scotland, or the Isle of Man, and in very few counties in England.

Donovan in his "Natural History of British Insects," published in 1796, writes, "*Papilio arion* is a very scarce insect in this country, and it does not appear to be much more common in any other part of Europe, as Fabricius only says "Habitat in Europæ Pratis. Mr. Lemon, a collector of eminence some years since, met with it in England."

British specimens of *Arion* belonged to the celebrated Duchess of Portland, and after her death, were sold at the sale of her Museum, in 1786.

In his "History of British Insects," 1795, Lewin writes, "This species of butterfly is but rarely met with in England. It is out on the wing the middle of July, on high chalky lands in different parts of the kingdom,

having been taken on Dover Cliffs, Marlborough Downs, the hills near Bath, and near Cliefden in Buckinghamshire."

Mr. Haworth received this local species from Dr. Abbott, who took it in 1798, in the Mouse's Pasture, near Bedford, where Mr. Dale afterwards took it in 1819.

It was also formerly taken on hills near Winchester, at Monk's Wood in Huntingdonshire, near Hereford, and at Charmouth, in Dorsetshire. Its metropolis appears to have been in South Devon, at the Bolt's Head, near Plymouth. It has also been met in some abundance at Clonelly, in North Devon, at Langport, in Somersetshire, and on the Cotswold Hills in Gloucestershire. From Gloucestershire we ascend to a Midland county, Northamptonshire, in which county a considerable number have been taken at Barnwell Wold, where it was discovered by the Rev. W. T. Bree, in July, 1837.

During the last five and twenty years, this fine species of Blue has been gradually disappearing from its known localities in this country. It was certainly extinct at Barnwell Wold, in 1865, and it has rarely, if ever, been seen in the Wold since the wet summer of 1860.

The following passage is extracted from a communication made to the "Entomologists' Monthly Magazine" for 1885, by Mr. Herbert Marsden:—"It was on June 17th, 1866, that I first saw the species alive, when in the course of a long ramble I captured it in a narrow valley amongst the Cotswold Hills. The early part of June, 1867, was dark and cold, and I only secured some twelve or fifteen examples. The season, May and June, 1868, was hot and brilliant, and *Arion* appeared on June 5th, which is the earliest date I ever heard of the species being out; but although rather more plentiful than the previous year, it was still rather scarce. In 1869, another fine or partially fine season, it was more abundant, and I find from my diary that on June 19th I took ten at rest about sunset. The year 1870, however, is the one to be marked with a white stone by the lovers of *Lycænidæ*; and *Arion* appeared much more widely distributed than in any other year I know of, either before or since. It would, I am sure, have been possible for an active collector to have caught a thousand specimens during the season, for in a few visits I secured about an hundred and fifty, not netting half of those seen, and turning many loose again. During the next few years *Arion* continued to appear, but very irregularly as regards numbers. The best seasons since 1870 being those of 1876 and 1877, the latter especially, but on no occasion has it been nearly so abundant as in 1870. Now come the dark days. The latter part of June, 1877, was damp and broken, not at all the bright warm weather which *Arion* loves. In dark, cloudy weather they are always

still, and, I believe, they will only deposit their eggs when the sun is warm and bright. In 1878 the weather was worse, there being hardly a fine day in the month, and less than a dozen were seen, mostly worn and weather-beaten, for there was scarcely two consecutive fine days. In 1879 the weather was still worse, and *Arion* scarcer than ever, while in 1880 only two were obtained and two three more seen. For the four years 1881-4, not one has been seen in the Gloucestershire district that I have been able to trace."

In the "Entomologist" for 1884, Mr. Bignell writes, "I feel quite certain that the haunts of *Lycæna arion* at Bolthead must be looked upon as a thing of the past. I visited the old familiar spots twice this year, 28th June and 5th July, without seeing a single specimen. On the 17th June, 1865, when I captured the above named species, the wild thyme was in full bloom. Many females I watched that day, flitting about depositing their eggs on the flowers of the thyme. But now all is changed, the fern, furze, and thyme, which held full possession of the slopes towards the sea are comparatively gone. The farmer who rents the land has annually burnt, first one spot and then another. I know *Arion* has been on the wing this year, for I have had the pleasure of seeing nine specimens, taken during the first week in July by a gentleman who had visited Bolthead, but gave it up in disgust. Although the eggs are laid on the flowers of the thyme, and the caterpillars feed upon them until the first moult, it is quite certain that it is not their food-plant; but what the food-plant is I am not prepared to say, but I strongly suspect it is one of the small *trefoils* or *vetches*."

The above mentioned nine specimens are the last that have been recorded as being taken in England, and were probably taken on a rough piece of ground near a village about ten miles from Kingsbridge, in South Devon, where Newman in his "British Butterflies" published in 1871, records it as being very abundant.

SUB-GENUS—AGRIADES.

Hubner.

All the species of this sub-genus or section possess a row of red or fulvous spots on the under surface of all the wings, near the hind margin.

The females bear a close resemblance to each other; indeed, Mr. Stainton in his "Manual" observes of two of the species, *Corydon* and *Adonis*, "The first real difficulty of the butterfly collector consists in the discrimination of the females of these species; the males can always be readily distinguished by the great difference in the ground colour of the upper surface of the wings.

Adonis well deserves its name, and is the most splendid Blue we have. *Corydon*, however, has a peculiar beauty of its own, it reminds one of the soft silvery appearance of moonlight, whilst *Adonis* recalls the intense blue of the sky on a hot summer's day. These gay colours are confined to the males, the females are clothed in sober garbs of brown. *Corydon* boasts of a more or less distinct spot on the upper surface of the hind-wings, this in *Adonis* we seek for in vain; and, besides, in *Corydon* we find the dark dashes in the white fringes broader and more conspicuous than in *Adonis*. A fainter point of distinction is, that the black spots of the underside are more conspicuous in *Corydon* than in *Adonis*." *Corydon* has, moreover, a more striking appearance than *Adonis*, and is normally the larger insect of two. The scales, again, with which each is sprinkled, are of the same tint as the respective males.

POLYMMATUS CORYDON.

Chalk Hill Blue.

CORYDON, Poda. Cor'ydon, a Roman shepherd. Virg. Ecl. ii. 56.

This species varies in the expansion of its wings from an inch and a line to an inch and three-quarters.

The male has the upper surface of the wings of a very light silvery blue with dusky hind-margins, which near the anal angle of the hind-margins are broken up into three or four spots. The female is brown, sprinkled with scales of the male colour, and has a row of fulvous spots round the hind-margin, most distinct on the hind-wings, which have also a less distinct central spot. Both sexes have white fringes, through which the wing rays form dark lines; these lines are broader and more conspicuous than are those of *Adonis*. The underside is of a brownish-grey or slate colour with distinct black spots in white rings, these spots are larger than those of *Adonis*, and give a bolder and a more striking appearance. A row of these spots round the hind-margin has an orange lunule to each, on the side nearest the base, forming a wavy orange line.

Many remarkable varieties of this species exist, especially on the underside.

Stephens in his "Illustrations" gives the following:—

Var. *b*. Above brown, with a blue disc, and a whitish discoidal dot with a black pupil: beneath, the posterior wings have a discoidal white-cinctured crescent, with a waved band of seven undulated spots towards the hinder margin. This is the *Calathys* of Miss Jermyn.

Var. *c*. Male with the hinder-margins of all the wings above with a very deep blackish fimbria; the ocelli on the posterior wings very strong.

Var. *d.* with the humeral spots beneath the anterior wings obliterated.

Var. *e.* all the wings beneath with the central discoidal spot alone; the margins with faint rudiments of ocelli.

Var. *f.* with the spots more or less confluent beneath, sometimes prolonged into dashes; the colour of the upper surface of the wings in both sexes varies much; the female has been found with the disc fine rich blue.

There are a great many named varieties:—

Var. *Albicans*, H.S., as its name implies, is a white form found in Andalusia.

Var. *Appenina*, Zell., is a very pale form found on the Italian mountains.

Var. *Hispana*, H.S., or *Arragonensis*, Gerh., is another pale form, with spotted hind-margin, found in Spain.

Var. *Corydonius*, H.S., or *Ossmar*, Bis., is a violet-blue form, found on the mountains of Asia Minor.

Var. *Caucasica*, Led., is a sky-blue form, from Armenia.

Var. *Syngrapha*, Kef. is a form of the female which resembles the male, except that there is a brownish band of orange rings or lunules round the hind-margin of all the wings. It occurs chiefly on the Swiss Alps, but I have a specimen taken in the South of England, and it has also been met with at Frankfort.

Var. *Calathæis*, Jermyn, has a discoidal white-cinctured crescent on the underside of the hind wings, below which, towards the posterior margin, is an undulated band consisting of seven ocellated spots; the forewings sometimes have a central spot and sometimes more. I have both male and female of the variety, and also a specimen with only a central spot on the underside of one of the forewings and several on the other.

Var. *Cinnus*, Hubner, closely resembles the last, but the hind wings are of a much darker brown, and the fore wings have seven black spots in white rings on the underside.

Var. *Parisiensis*, Gerh., closely resembles the type with the exception of a white streak on the underside of the hind wings.

Besides these there are other remarkable varieties. Mr. Welman has a female taken at Croydon, with a small patch of the male colour on the fore wings, and a larger patch on the hind wings; and I have one which is chalky white on the underside, and has only one black spot, and that in the centre of each fore wing.

The caterpillar is very similar to that of *Adonis*, but is of a lighter and and brighter green, and the hairs it is covered with are of a light brown. In every other particular of form and ornamentation the two agree. It feeds on *Hippocrepis comosa*, *Anthyllis vulneraria* and other allied plants.

In the description of *Papilio Machaon*, it will be remembered that a distinguishing mark of the caterpillar, is a reddish coloured forked appendage just behind its head, which, when the creature is alarmed, gives out a strongly scented fluid. According to Dr. Hagen, a somewhat similar process exists on the caterpillar of *Corydon* and its allies, but this seems attractive rather than protective. Dr. Hagen writes, "You find on the penultimate segment outside and behind the stigmata, two large white spots, each one of which originates a white membranous tube, just like the finger of a glove, the top of which is not entirely drawn out. On the ante-penultimate segment is a large and transverse opening behind and between the stigmata, near the apical border. It looks like a closed mouth with lips, but I have not seen anything protruding from it. These were first, I believe, discovered by Guenée, and the fact that ants hunted the caterpillars, and followed them for the sake of the secretion was first remarked by Professor Zeller. This ant companionship is detailed in a very interesting manner by Mr. Edwards, in his 'Butterflies of North America,' under the head of *Lycæna Pseudo-argiolus*, from which much of the above is quoted."—Extracted from Mr. Jordan's "Review of Buckler's Larvæ of British Butterflies," in *Entomologists' Monthly Magazine*, Vol. 23.

The chrysalis is short and rounded, and of a pale greenish-brown colour.

The butterfly appears on the wing in the middle of July, and continues out to the first week of September. In the wet year of 1879, I met with both it and *Adonis* on the 2nd October, but it must be looked upon in the light of a retarded emergence. The females appear later than the males, and are much less frequent. They lay their eggs in August, and the caterpillars being hatched in September, hybernate small, feed up in the spring, and turn to the chrysalis state in June.

On the Continent it is found generally in the Central and Southern portions of Europe, from Spain to the South of Russia, and it also occurs in the West of Asia. Though called the Chalk Hill Blue, *Corydon* is much more widely distributed in England than *Adonis*. It is most plentiful in the South, but is not uncommon in some places in Lancashire in the West, though it is not found in Yorkshire in the East. It is most plentiful on the chalk and limestone, but is occasionally found elsewhere. It has never been met with in either Scotland, Ireland, or the Isle of Man.

Petiver figured it in 1702, in his "Gazophylaci Naturæ et Artis," and Ray, in his "Historia Insectorum," writes "Hanc in cellibus Banstediensibus prope Epsam invenit D. Petiver; eumden etiam nuperrime observavit D. Dale prope Newport oppidum in Essexia."

POLYOMMATUS ADONIS.

Clifden Blue.

ADONIS, W.V. Ado'nis, a young shepherd beloved by Venus. Virg. *Aln.* x. 18.

The name of *Adonis* was bestowed in the Vienna Catalogue, published in 1776, and the name of *Bellargus*, in *Der Naturforscher*, published in 1775.

The former name was adopted by Fabricius, who attempted to combine in some degree Natural and Civil History, by attaching the names of personages illustrious in their day, to the butterflies; thus following the example of the illustrious Linnæus. The only exception Linnæus appears to have made to this rule was in naming a few species after the plants on which their caterpillars feed.

Linnaeus is recorded as having said, "If Fabricius comes to me with a certain insect, and Zoega with a certain moss, then I pull off my hat and say, 'Be you my teachers.'" Unfortunately, some entomologists of the present day, following the harsh and stern rule of priority to too great an extent, discard the beautiful name of *Adonis* for that of *Bellargus*. Linnæus laid down a rule in his "*Critica et Philosophia*," that no adjective should be admitted as a generic name. On this ground he expunged several names of other authors. In a letter to Haller, written on June 8th, 1737, Linnæus says, "Those who come after us, in the free republic of Botany, will never subscribe to authorities sanctioned only by antiquity, why, therefore, should we retain barbarous or mule names, or names distinguished only by their tails? If specific names require alteration, why may not false generic ones likewise be changed?"

The species varies in the expansion of its wings from an inch and a line to an inch and a half.

The male has the upper surface of the wings of a lovely clear bright blue, with a slender black line round the hind margins. The female is brown, sprinkled with scales of the male colour, and has a row of fulvous spots, brighter than those on *Corydon*, round the hind margin, most distinct on the hind-wings. Both sexes have white fringes, through which the wing rays form dark lines. The underside is of a brownish gray or slate colour, with distinct black spots in white rings; these spots are smaller than those on *Corydon*. A row of these spots round the hind margins has an orange lunule to each on the side nearest the base, forming a wavy orange line. The female is slightly smaller than the female of *Corydon*.

Many remarkable varieties of this species exist, especially on the underside. Stephens, in his "Illustrations," gives the following:—

Var. *δ*. With the ocelli beneath more or less confluent.

Var. *c*. With the fulvous band on the hinder margin of all the wings obliterated.

Var. *d*. With the humeral spots of the anterior wings beneath obliterated.

Var. *e*. With all the ocellated dots beneath very small, and several of them deficient.

Var. *f*. With the central discoidal spot alone remaining, the marginal fascia merely indicated by a few indistinct dusky lunules.

The varieties in ocellation are endless: some have the ocelli nearly round, others more or less elongate; some very large, others extremely small; the white blotch on the posterior wings beneath, also varies much in size and form.

A few named varieties exist.

Var. *Ceronus*, Esp., is a form of the female which is very much suffused with blue on the hindwings, and the male has a marginal band of fulvous spots on the upper surface of all the wings.

Var. *Urania*, Bischoff, is a form of the male found in Turkey, which is black, suffused with blue; this is perhaps the same as the *Polona* of Zeller, which occurs on the mountains of Asia Minor.

Var. *Cinnus*, Hub., has the spots on the underside of the posterior wings not ocellated. Besides these, there are other remarkable varieties. I have a female of the same colour as the male, thus corresponding to the var. *Syngrapha* of *Corydon*. Mr. Briggs has a female with dashes of the male colour on the tip of one wing, and females are occasionally very much suffused with blue. A very strange variety was taken at Folkestone in September, 1875, being very dark bluish-black on the upperside with a bluish-gray fringe, and shot with coppery reflection on the underside. Mr. Briggs has a female which is almost black on the underside, with the exception of a white central ring on each wing, and the marginal row of fulvous spots; and Mr. Stevens has another which is unusually pale on both the upper and under sides.

The egg of *Adonis* is small, round, and of a light dull grey, with white reticulation and knobs.

The Caterpillar is very similar to that of *Corydon*, but is of a deeper and darker green, the hairs it is covered with are black. There is a double dorsal row of eight humps or segments. The side spreads out to a rounded ridge running round the body, and hiding the legs from view when the caterpillar is at rest.

The chrysalis is obese, with some very small hairs scattered over it. The colour is at first greenish on the wing-cases, greenish-brown on the rest of the body, afterwards it is ochreous all over.

The butterfly appears on the wing in May or the beginning of June. The egg is doubtless laid that month, and the caterpillar should be found feeding on *Hippocrepis comosa* (the Tufted Horseshoe Vetch), in June and July.

In August the second brood appears, the caterpillars from which, hibernating when small, feed up the following spring, and enter the chrysalis state in April or the beginning of May.

It is very common in many parts of Europe, North Africa, and Asia Minor. In North-Eastern and North-Western Europe it is much more local than in the South, being especially attached to the chalk and limestone.

It is unknown as an inhabitant of Scotland, Ireland, or the Isle of Man, and in England is a more southern species than *Corydon*, not occurring north of Gloucestershire and Buckinghamshire.

The first account I can find of its occurrence in England is in the "Aurelian's Pocket Companion," by Moses Harris, published in 1775, as being found on commons near Clifden.

Lewin, in his "Insects of Great Britain," 1795, writes, "This most beautiful species of butterfly was first observed and caught at Clifden, in Buckinghamshire, and for that reason has always retained the name of Clifden Blue; however, it is pretty common in various parts of England, and is to be taken on chalky pastures. The flies are on the wing the middle of June; and as they do not fly from the place where they are bred, and frequently settle on the ground, they may be easily taken."

Haworth, in this "Lepidoptera Britannica," 1803, writes, "*Adonis*, being by far the most lovely of the British Blues, is much sought after by our inferior collectors; who make annual and distant pedestrian excursions, for the sole purpose of obtaining its charming males to decorate their pictures with; a picture, consisting of numerous and beautiful lepidoptera, ornamentally and regularly disposed, being the ultimate object of the assiduous people in the science of Entomology. These pictures are of various shapes and sizes: I have even seen some which have contained 500 specimens."

Some of the Spitalfield collectors, after toiling at their weaving machines all the week, used to start at 10 o'clock on Saturday night, in order to arrive at Darenth and Birch Woods by daybreak, so as to collect the twilight-flying moths. Daniel Bryder, one of the most industrious of these collectors, and who was employed by Mr. Wilkin to collect for him in the New Forest, was the first of the Spitalfield collectors who attempted to arrange his insects

scientifically. The feelings of this class of persons Crabbe thus records in his "Borough":—

"There is my friend the weaver; strong desires
Reign in his heart, this beauty he admires.
See to the shady grove he wings his way
And feels in hope, the raptures of the day—
Eager he looks, and soon to glad his eyes
From the sweet bower by nature formed, arise
Bright troops of virgin moths and fresh-born butterflies
—He fears no bailiff's wrath, no baron's blame,
His is untax'd and undisputed game."

POLYOMMATUS DORYLAS.

Dartford Blue.

DORYLAS, W.V. Dórylas, one of the conspirators against Perseus, and slain by him. Ovid Met. V. 130.

In Lewin's "Insects of Great Britain" published in 1875, figures are given of a *Polyommatus* under the name of "*Hyacinthus*," of which he writes "I met this new species of butterfly in the middle of July, flying on the side of a chalk hill near Dartford, in Kent, and have no doubt but there was a constant brood at that place, as I found them there for two successive years on the wing, in the middle of the same month. The male is figured with the wings expanded, at fig. 4; the female at fig. 5; and the under-parts at fig. 6." Ochenheiner refers these figures to Dorylas, W.V. J. F. Stephens in his "Illustrations," doubtingly gives Lewin's insect as distinct from *Adonis*, and in his last publication (the Museum catalogue), it stands as variety "a" of that species. Henry Doubleday in the *Zoologist*, Vol. 21 writes, "I have examined the specimens contained in the cabinet of the late J. F. Stevens. They are certainly not Lewin's species, but merely ordinary specimens of *Adonis*; and the same may be said of the specimens marked '*Ceronus*, Hub.,' which is a variety in which the female is of nearly as brilliant a hue as the male. I do not know whether any of Lewin's specimens are now in existence, but his figures most certainly represent the sexes of *P. Dorylas*, which is distinguished from *Adonis* by its paler blue colour slightly tinged with green, immaculate cilia, and the absence of the two transverse ocelli at the base of the superior wings beneath." The female is of the same colour as the male; but the fore-wings are broadly bordered with black, and the hind-wings have a row of bright fulvous spots round the hind-margin.

The caterpillar is dark green, with yellow streaks and a black head; and lives on the flowers of *Melilotus officinalis* in Spring and Autumn, being

double brooded. It is found in May and August, in many parts of Europe, but is local and not very common, frequenting grassy woods and hills, especially on a limestone soil. It is almost absent from the plains of Northern Germany, and there is no trustworthy record of its occurrence in Britain since the time of Lewin.

POLYOMMATUS ICARUS.

Common Blue.

ICARUS, Rott. Icàrus, the son of Dædalus, who flying with his father from Crete with artificial wings, flew too high, whereby the sun melted his wings, and he fell into the sea, which from him was called the Icarian Sea.

This species varies in the expansion of the wings from three quarters of an inch to one inch and five lines.

The male has the upper surface of the wings of a lilac blue. The form of the female most frequently met with is brown, much suffused with blue; and has a series of distinct fulvous crescent-shaped spots near the hind-margin of all the wings, forming a wavy line. The fore-wings of the female have a black discoidal spot, and the hind-wings have a marginal row of black spots edged with white on one side, and having the fulvous spots on the other. Both sexes have white fringes, but they are not intersected by the wing rays, as in *Corydon* and *Adonis*. The underside is of a pale grey or pale brown colour with distinct black spots in white rings, and a row of distinct fulvous crescent-shaped spots round the hind-margin.

The varieties of this species are innumerable, both in size, form, and colour, some of the females have the fore-wings very much rounded at the tip, others somewhat acute; the hind-margin of the fore-wings is frequently spotted with white, and the disc sometimes has a round white dot with a central black spot. some specimens are remarkably clear, and so transparent that the ocelli on the underside of the wings are plainly observable on the upper. Some females have the fringe entirely brown, and others quite white; some have the upper surface of the wings nearly as blue as that of the males, with a black central spot; whilst others are plain brown, without the least vestige of blue. The number of ocelli also varies greatly. Specimens occur occasionally that are true hermaphrodites, having the wings on one side male and on the other female. A specimen is in Mr. Gregson's collection which has the fore-wings male, and the hind-wings female. A very extraordinary one has the left side male and the right side female, except that about two-thirds of the inner portion of the fore-wing is of the male colour, leaving a stripe along the costa of the usual colour of the female.

Var. *b.* (*Icarinus* Scriba.) Differs from the type by the absence of the basal spots on the underside of the fore-wings.

Var. *c.* (*Labienus*, Jermyn.) Wings pale pinkish-blue above, and without the fulvous spots beneath.

Var. *d.* (*Lacon*, Jermyn.) Has the disc of the wings on the underside marked only with a triangular spot; the hind-margin of the anterior with a few indistinct dusky marks, and of the posterior with a fulvous band terminated internally with a series of black wedge-shaped spots, and externally with black dots on a white ground.

Var. *e.* (*Thestylys*, Jermyn.) Is formed of a large specimen of the female, in which the blue of the upper surface is much more extended than in the type. The anterior wings beneath has a large kidney-shaped black spot cinctured obscurely with white, the concave side turned towards the inner margin; the posterior wings with the spot next the costal margin kidney-shaped, the concave side turned towards the disc.

Var. *f.* The anterior wings have a distinct marginal band of fulvous crescents surmounted with black, and the central spot of the underside of the posterior is obsolete.

Var. *g.* Like the preceeding, but in the band on the upperside of the hind-wings, the posterior part of the iris is silvery.

Var. *h.* (*Iphis*, Baumh.) A brown form of the female, without any blue.

Var. *i.* (*Thersites*, Baumh.) A blackish-brown form of the female, with a row of small fulvous spots near the hind-margin of the hind-wings, but none on the fore-wings.

Var. *j.* (*Cærulea*, Gar.) A lilac blue form of the female, with broadly black hind-margin, otherwise like the type. This is probably the *Icarius* of Miss Jermyn, and the *Amandus* of Hubner.

Var. *k.* (*Pusillus*, Gerhard.) Appears to consist of very small blue males and brown females.

Var. *l.* (*Eros*, Steph.) The male above very pale greenish-blue, with a narrow marginal black streak; the posterior wings with a few blackish spots on the margin; on the underside is a faint yellowish band.

In addition to the above there are some very interesting varieties. Violet; blue shot with mauve; and sky-blue males are known; and the underside of a very singular variety, taken near Cambridge, by the Rev. Rudston Read, is figured in the "Entomological Transactions" for 1853. In this specimen the usual ocelli were absent, but on each wing was a row of strong black marks within the posterior margin, not extending outwardly beyond the red spots on the lower wings, and similarly situated on the upper wings, but

there the red spots were wanting. Only part of the posterior ocelli were represented by black dots.

A more extraordinary one still was taken by my father, in Dorsetshire, on August 5th, 1826. The underside of this specimen is of a cream colour, the usual ocelli are absent, but replaced on the fore-wings by two black streaks near the centre, and on the hind-wings by a very few minute black dots; the fulvous band of spots same as in type, but the marginal row of black spots wanting. I have a variety of *Corydon* almost identical with this, given me by Mr. Ross.

The egg is circular, and of a greenish-white colour, covered with tiny hairs; it has a pale line above the projecting sides, and several pale oblique lines on each side, and a small black head; the segmental divisions and a sunk dorsal line are of a darker green. When young, the colour is grey tinged with purple, and it makes its exit from the egg by eating a large round hole in the centre of the upper surface, leaving the rest of the shell untouched. For some days its only method of feeding is by eating into the substance of a leaf of the Bird's-foot trefoil (*Lotus corniculatus*), either from the upper or lower side, leaving the opposite skin as a white spot; afterwards it feeds on the flower as well as on the leaves. The Rest Harrow (*Ononis arvensis*) and clover are also food-plants.

The chrysalis is dull green, with brownish markings, short and stout, nearly as round at the anal extremity as at the head.

The butterfly appears on the wing in May, and soon becomes very plentiful, continuing throughout June in great abundance. The caterpillars from this brood feed up rather quickly, and even by July, the second brood of the butterfly may be taken. Late in the season, September and October, dwarfed specimens are found, which may be a third brood, but this appears to depend very much on circumstances. When the weather is unsuitable, few of the last brood appear, and it is probable that the caterpillars feed up and enter the chrysalis state in the autumn, or hibernate, according to the season; those which hibernate producing the largest specimens of the butterfly. The most northerly specimens are the largest and brightest, and perhaps the reason may be found in the fact of their remaining the longest in the caterpillar state.

This is the commonest of all the Blues, abounding in meadows, on heaths and downs, and not at all confined to chalky soils like its congeners, and occurs all over the British Isles, from the Isle of Hoy, the most northerly of the Shetlands, to the Lizard Point in Cornwall.

It is common all over Europe, Northern and Western Asia, as far as the Himalayas, and North Africa.

The first English author to figure it was old Mouffet, in 1633, in his "Insectorum sine minimorum Animalium Theatrum."

Besides giving a figure of the upper and another of the underside, he gives the following description, &c.—

"Lætiores ad aspectu prodit, alis oculatis, cyanum cœlestem atque incomparabilem spirantibus. Fecit illam Dedala rerum artifex natura totam oculeam, adeo ut illum in Mythologo Arctoris filium, non pavonis caudæ infertum, sed in hujus alis habitantem haud inepte fingeres; quas quidem non minori superbia adnerso sale expandit, atque illa avis Junonia, quam, præ celesti quo excellit colore, fere in ruborem dat."

It is also described in the "Pinax," of Dr. Merrett, published in 1667, as follows: "Alis oculatis cyanum cœlestem spirantibus."

It is also figured in Petiver's "Gazophylacii Naturæ and Artis," in 1702, under the name of "*Papiunculus cœruleus vulgatissimus*, Blue Argus"; very common on heaths from June to August.

In his "Aurelian," published in 1775, Moses Harris writes: "They are seen in plenty about the beginning of June. See Linn. Papil. Pleb. 232, Argus. Perhaps this is designed for it."

Lewin writes in 1795, "There are at least two broods of these butterflies annually; or rather a constant succession of them from June to September. They are very common, and are to be seen in almost every situation."

POLYOMMATUS ALEXIS.

Brown Argus.

ALEXIS, Scop. Alex'is, a Roman Shepherd, Virg. Ecl. ii. 1.

It cannot cause surprise that a butterfly which has caused so much discussion has had many names. Lewin, in 1795, called it *Idas*, which name was also used in 1803, by Haworth, who transcribes Donovan's remarks in his "Natural History of British Insects," vol. ix, published in 1800: "This insect must not be confounded with the *Papilio idas* of Linnæus. The Linnæan *P. idas* is evidently the female of *P. argus*; a circumstance unknown to that author, who considers them as distinct species, from their very dissimilar appearance." Haworth goes on to say, "The above remarks are very appropriate, and worthy my transcription: but they render it necessary to keep in mind, that the *Papilio argus* of Donovan is not in either of the sexes, the *Papilio argus* of Linnæus or other authors; its male being the *Papilio icarus* of Lewin and of this work, and its female being the *Papilio adonis* of Fabricius, &c. The genuine *Argus* of Linnæus is not figured by Donovan at all. What I have remarked relative to *Idas* being a distinct species with

Linnæus, must be applied to his 'Fauna Suecica' alone; for in the 13th edition of his 'Systema Naturæ,' I find he makes the species *Idas* of the fauna, the proper female of his *Argus*, thereby laudably and liberally correcting in maturer years, this error of his youth."

Possibly Donovan was led into error by Moses Harris, who figures *Icarus* in his "Aurelian," and in the letterpress writes, "See Linn. Papil. Pleb. 232, *Argus*. Perhaps this is designed for it."

The species varies in the expansion of its wings from an inch to an inch and two lines. The upper surface of the wings of both sexes are brown, with a row of bright orange spots at the hind-margin of all the wings, and with narrow white fringes, and also with a black central spot. The underside is of a greyish-brown, with black spots in the white rings, none of which are nearer the base of the fore-wing than the central spots, and with a row of orange spots at the hind-margins. This is the form found in the South of England, and better known as *Agestis*, W.V. It is also the form most frequently found on the Continent of Europe.

Var. *Allous*, Hub. differs from the type by the absence of the row of orange spots. I have a specimen of this form, taken in Castle Eden Dene, in company with *Salmacis*, by my father in August, 1837. In the South of Europe, all the second brood are of this form.

Var. *Artaxerxes*, Fab., Scotch Argus. This differs from the type by the discoidal spot on the forewings being white instead of black, by the row of orange spots being partly, or in some specimens totally, absent on the upper-side; and with the eye-like spots on the underside being entirely filled up with white. This form is unknown on the Continent, and Fabricius received it from Mr. Jones, of Chelsea. These specimens probably came from Dr. Walker, who met with them at Rosslyn Castle, in August, 1797.

Var. *Salmacis*, Steph. Durham Argus, is an intermediate form, has the orange spots less vivid than the type, a black discoidal spot, but the white spots on the underside without black centres.

Var. *Æstiva*, Hub., is a brown variety of the underside.

Varieties also occur in which the spots on the underside differ. One has the central spot only, another is without it, and sometimes the spots are elongated into streaks, a form of variety noticed in several species of the genus.

The sexes of this species closely resemble each other, but in the female the marginal band of orange spots is slightly broader.

The egg is of a pale greenish drab colour, covered with a coarse prominent reticulation; it is smaller than that of *Algon*, though very like it in form and sculpture, being circular, and flat, with a central depression on the upper surface.—Buckler.

The caterpillar is of a pale green, with a purplish brown dorsal line, and two very pale oblique lateral lines. It is short and thick, arched on the back, covered with fine white hairs, and a black head. It feeds on the leaves of the Sun Cistus (*Helianthemum vulgare*), and the Heron's Bill (*Erodium cicutarium*.)

The chrysalis is smooth, rather thick in proportion, of a pale green colour with a deep pink stripe at the sides, enclosing a central white one, and has the head rounded and prominent.

It is found throughout Europe, North Africa, and Northern and Western Asia to the Himalayas, from May to August, frequenting dry sunny places, especially on chalk or limestone. On the Alps it is found to the tree limit. In the South of England the butterfly appears at the latter end of May, or in June, at the end of which month it may be found in more Northern localities. The caterpillars are to be found in June or July, in the South, and the butterfly is again on the wing in August. The caterpillars of this brood hibernate to reappear in April or May. In Scotland there is but one brood, the caterpillars of which pass the winter quite small, to feed up in the spring.

The white spotted variety *Artaxerxes* seems to be entirely confined to Britain, ranging from Richmond (54½" N.L.) to Kincardineshire (57" N.L.), and in Scotland from sea to sea. Throughout all this district it appears only once in the season. The black spotted variety *Agestis* has a wide European range, from Gibraltar in the South (36" N.L.) to Upsala in the North (60" N.L.); and from England on the West to the Ural Mountains on the East. In England as far North as London and Bristol, it seems to be double brooded; whilst at Liverpool and so Northwards only single, making its appearance simultaneously with the *Artaxerxes* form.

The Southern form *Agestis* was figured by James Petiver in his "Gazophylaci Naturæ et Artis," published at London, in 1702; and also in his "Papilionum Britannicæ," 1717. It was also figured by Lewin in his "Insects of Great Britain," published in 1795, as well as the Northern form *Artaxerxes*, accompanied by the following letterpress—"Brown Blue Idas, Linnæus. This is a common butterfly with us, and to be taken in almost every dry pasture field, or in the open parts of woods, flying, the first insect in June, when it first makes its appearance. There is also a later brood of this species in August."

"Brown White Spot, *Artaxerxes*. This new species of butterfly was taken in Scotland, and is now in the collection of Mr. William Jones, of Chelsea."

In his "Lepidoptera Britannicæ," 1803, Haworth records *Artaxerxes* as being very rare in the fields of Scotland, but not in England, as Christian

Fabricius has said in error, and adds that his specimens were taken in Scotland, by his very dear friend Dr. F. Skrimshire.

In the XVI. Vol. of the "Natural History of British Insects," published in 1813, Donovan writes "To the great astonishment of our English collectors of Natural History in the vicinity of the Metropolis, *Papilio Artaxerxes*, an insect hitherto esteemed of the highest possible rarity, has been lately found in no very inconsiderable plenty in Britain; for this interesting discovery we are indebted to the fortunate researches of our young and very worthy friend, W. E. Leach, Esq., who met with it common on Arthur's Seat, near Edinburgh, and also on the Pentland Hills. A discovery so interesting in the annals of Entomology, because *Papilio Artaxerxes*, was not merely esteemed rare in this country; on the Continent it appears to be totally unknown: there entomologists, till the time of Fabricius, have not mentioned it, nor had Fabricius himself once seen an example of the species; he derived his information solely from a drawing by the hand of W. Jones, of Chelsea. The extreme accuracy of that delineation, it must indeed be allowed, would render it unnecessary for Fabricius to consult the insect from which it was portrayed, but the circumstance is mentioned in order to prove the rarity of the species as an European insect; and we cannot, it is presumed, afford a more decisive testimony of its interest in this respect than in stating Fabricius, its original describer, had never seen it. *Papilio Artaxerxes* is by no means striking in appearance; it becomes important from the general estimation of its scarcity, and its claim to consideration in this view is indubitable. In the best of the English cabinets, with the exception of that of our sincere friend, A. M'Leay, Esq., we have often lamented to observe a deception intended to supply the deficiency of this species; namely, a little painting of the insect, carefully consigned on a pin, to the most obscure corner of the drawer, and which has oftentimes, we suspect, been mistaken for the original: this we apprehend, should not be reprehended in terms of unusual severity—yet we cannot think the custom wholly blameless. We have alluded to the cabinet of Mr. M'Leay, and it will therefore be right to add in explanation that his valuable and extensive collection contained a very fine specimen of *Papilio Artaxerxes*, that had been taken in Scotland previously to the discovery made by Mr. Leach."

Curtis, in his "British Entomology," writes, "Mr. Dale and myself took specimens amongst grass in stony and barren places at the base of Arthur's Seat, the end of June and in August, 1825."

Stephens in his "Illustrations," 1828, writes concerning *Artaxerxes*, "A very local species, and hitherto supposed to be peculiar to Scotland, but it has lately been taken in the North of England." And in the following vol.,

1829, "I have recently obtained specimens of what seems to be a new species of *Polyommatus*, intermediate between *Agestis* and *Artaxerxes*, and which I propose calling *Salmacis*." These were taken in Castle Eden Dene, by G. Wailes, Esq. Mr. Wailes, concerning this, writes to the first volume of the "Entomological Magazine" published in 1833, "I entirely coincide with Mr. Stephens in considering this a distinct species. I must, however, state that Mr. Stephens' description, in his invaluable Illustrations (Haust. Vol. III. p. 235), is not quite correct; for I have observed, out of about 150 specimens that the variety with the black spot forms two-thirds of the whole; and that neither sex possesses exclusively either the white or black spot, though the majority of the former variety are males. It appears to be confined to the sea banks, and I have never seen it above half-a-mile from the coast."

In the same volume amongst the "Observations on the influence of locality, time of appearances, &c., on species and varieties of Butterflies, by J. C. Dale, Esq., M.A., F.L.S., &c." is the following, "*Polyommatus salmacis* is intermediate between *Agestis* and *Artaxerxes*, in Scotland none of the *Agestis* are to be found, they are all *Artaxerxes*; in the south none of the *Artaxerxes* are to be found, they are all *Agestis*. At Newcastle, they appear to be mules or hybrids, between the two species, partaking in some degree of the character of both; some of the varieties have a black spot inside the white one, or the upper surface of the first wings."

This appears to have drawn forth from the pen of Mr. Edward Newman, in the second volume of the same publication, p. 516, the following, "From examining specimens of *Polyommatus agestis* from different localities, I have arrived at a conclusion which will not, I fear be coincided with by many of our Lepidopterists. On the South Downs of Sussex and Kent, *Agestis* assumes what may be called the typical form. I have taken it at Ramsgate, Dover, Hythe, Hastings, Brighton, Rye, Worthing, Little Hampton, Chichester, Portsmouth, in the Isle of Wight, in Dorsetshire, in Somersetshire, and throughout this range it is very similar; then going upwards, I have met with it at Worcester, Birmingham, and Shrewsbury: here an evident change has taken place, the band of rust coloured spots has become less bright; at Manchester, these spots have left the upper wing entirely; at Castle Eden Dene, they are scarcely to be traced, and a black spot in the centre of the upper wing becomes fringed with white, in some specimens it is quite white; the butterfly then changes its name to *Salmacis*. We proceed further northward, and the black pupil leaves the eyes on the underside, until at Edinburgh they are quite gone; then it is called *Artaxerxes*. The conclusion I arrive at is this, that *Agestis*, *Salmacis*, and *Artaxerxes* are but one species.

Mr. Dale, in the "Naturalist," Vol. I., page 16, says, "I have observed a

few of *Artaxerxes* having a slight black pupil to the ocelli on the reverse side; and one I took at Duddington Lock has it more distinct than some of those at Newcastle, where it assumes the name *Salmacis*, some resembling the former, and others differing but little from one southern species or variety *Agestis*, and which have been supposed by some persons to be hybrids. From those who contend for three species, I would request opinions as to specimen lately taken, near Langport, being evidently a remarkably fine female of *Agestis*, having a more complete white spot with black pupil than any I have seen from Newcastle; and I have a specimen or two shewing a little white cincture to the black spot. Surely it would be going too far to make a fourth species, and yet it is better than *Salmacis*. I think this proves beyond doubt that there is but one species. Mr. Bentley has a beautiful variety of *Agestis*, totally destitute of black ocelli on the reverse side."

Mr. Sircom, writing to the "Zoologist," Vol. II., says, I have in my small collection *Salmacis*, which I captured on Durdham Down, Bristol. The cabinet of one of my friends contains a similar specimen, taken in the Isle of Wight."

In his elaborate notice of *Agestis*, in his "Catalogue of the Lepidoptera of Northumberland and Durham," published in 1858, George Wailes concludes with "I think I am justified in writing the three forms of this butterfly, under the single name of *Agestis*," thus retracting his former opinion.

When Professor Zeller, in 1867, published his most interesting history of this species in the "Entomologists' Monthly Magazine" (Vol. 4, p. 73-77), he stated it to be generally accepted that *Polyommatus Artaxerxes* is only a variety of *Agestis*; and yet it appeared to him extremely improbable that the caterpillars of *Agestis* should habituate themselves to the food-plant of *Artaxerxes*. However, in Vol. 6 of the same periodical, he writes thus, "On the 8th May, this year, 1869, I received four caterpillars of *Artaxerxes*, sent expressly for me from Edinburgh. Three were full grown, so that one was a chrysalis already on the 10th. The fourth was much smaller; and as the *Helianthemum vulgare* does not grow in the vicinity of Stettin, I offered it some young plants of *Erodium cicutarium*, and lo, it bored directly into a flower bud, which on the following day I found eaten out." On the 3rd June, 1877, Mr. Robson, of Hartlepool, whilst searching *Helianthemum vulgare* growing near the coast in his locality, found five caterpillars of a *Polyommatus*, which he at once forwarded to Mr. Buckler. These he fed upon *Helianthemum*, and they in a short time entered the chrysalis state; two of them were, unfortunately, attacked with mould, but the other three disclosed three differently marked butterflies, viz. on July 2nd, 5th, and 7th. These appeared to be respectively *Salmacis*, *Artaxerxes*, and *Agestis*, but to partake most

of *Salmacis* on the underside. These larvæ were all alike, and in no respect distinguishable from larvæ of *Artaxerxes* found at Arthur's Seat, and previously reared by Mr. Buckler.

POLYOMMATUS ÆGON.

Silver-studded Blue.

ÆGON, W.V. Ægon, a Roman Shepherd, Virg. Ecl. iii. 2.

This species varies in the expansion of its wings from an inch to an inch and two lines. The male has the upper surface of the wings of a deep purplish blue, with dusky hind margins, and white fringes. The female is brown, sometimes much suffused with blue, and has a row of orange lunules at the hind-margin of the hind-wings, most distinct at the anal angle. The underside is bluish-grey in the male, greyish-brown with bluish base in the female, and has a marginal band of fulvous spots, and three rows of black spots in narrow white rings. On the underside of the hind-wings, near the edge, is a row of metallic spots of a bluish tint, shining like polished silver, from these Moses Harris named it the "Silver-studded Blue." Some striking varieties of this species have been observed. In one, captured by Mr. Hatchett, at Coombe Wood, the upper surface of all the wings is of a pale fulvous tawny colour, like that of *Satyrus pamphilus*. Mr. Briggs has an exceedingly pale specimen, and I have one with the right wings male and the left wings female. In another, taken by Mr. Haworth, in salt marshes near Holt, Norfolk, and thence named by him *P. maritimus*, the ocelli on the disc of the underside of the wings are elongated into those on the middle of the wing, being almost confluent with the following row of spots. To a specimen of this variety, the Rev. W. Kirby applied the manuscript name of *Alcippe*, but Mr. Stephens applies that name to another, and apparently very distinct variety, of smaller size, having the wings narrower, blue above, with a broad, black margin to all the wings, the underside of the male of a deep greyish or drab colour, the ocelli very distinct in the female, and the oblique series on the posterior wing consisting of four. This is probably the *Algidion* of Gerhart. The variety *Leodrus*, Hub., is brown, and has the orange band very distinct on the upper surface of all four wings. The variety *Bella*, H.S., found in Asia Minor, has the underside of the wings paler than the type, and a row of marginal spots. I have a brown variety of the female which has the marginal row of spots wanting, and replaced on the lower wings by a marginal row of white rings.

The egg is rather large in proportion to the size of the butterfly. It is white in colour, of a circular form, flattened and depressed in the centre both

above and below, covered with raised white reticulation, all except the top.—Buckler.

The caterpillar is of a bright yellow green, with black head and legs, a blackish brown dorsal line edged with white, and yellowish green oblique marks on the back and sides. It feeds on *Ornithopus perpusillus*, and probably on some of the lesser trefoils, as *P. ægon* occurs in Portland, whereas the *Ornithopus perpusillus* is not known there.

The chrysalis is less than half-an-inch in length, and of a dull green colour with a brown dorsal line, the wing cases being rather long in proportion.

The butterfly emerges from the chrysalis state at the end of June or July, and continues on the wing for about two months. In 1877, I met with it as late as the 17th September. The eggs do not hatch till spring, the dates being from the end of February to about the end of March. The caterpillars feed but slowly, changing their skin for the last time from 11th to 15th June, and turning into chrysalids by the 24th, remaining in that state about three weeks. The chrysalides are generally slightly attached, after the usual manner of the genus, viz. by a button at the tail and a belt of silk round the middle, to a stem of the food-plant, at the very bottom and partly in the earth: sometimes they are attached to large stones.

It appears to be generally distributed throughout Central and Southern Europe and Asia Minor, frequenting heaths and stony pastures. In England it is widely but not generally distributed; but is scarce in Scotland, not being found north of Perthshire; and it also occurs at Wicklow, in Ireland.

It was figured in 1717, by James Petiver, in his "*Papilionum Britannicæ*," under the name *Papiunculus plumbeus parvus*, Small Lead Argus." Moses Harris, in his "*Aurelian's Pocket Companion*," published in 1775, records it as haunting commons. Lewin, in 1795, writes "This pretty little butterfly is very common. It is out on the wing the second week in June, and flies mostly in low reedy meadows."

Family ERYCINIDÆ.

The only notable distinction between this and the last family is in the perfect insect, the males of which, in the Erycinidæ have only four perfect legs, while the females have six. Both sexes of the Lycænidæ have six perfect legs.

The Erycinidæ are most numerous in Tropical America, but several are found both in Asia and Africa, but only one in Europe, which occurs also in Britain. They are of small size, and extremely varied in their forms. Thus

some of them resemble the tailed species of Papilionidæ and Nymphalidæ; others the long-winged Heliconidæ; others the blue and copper species of Lycænidæ; and some the dusky and spotted Hesperidæ. About 700 species are included in Kirby's Catalogue of 1871. The curious *Libythea*, included by Kirby with the present group, has one European species, *Celtis*. It has a caterpillar like those of the Pieridæ, a chrysalis suspended by the tail only like Nymphalidæ, and the perfect insect has brush-like fore feet in the male like the Erycinidæ.

GENUS XI.—NEMEOBIUS.

Stephens.

NEMEOBIUS.—Nemos, a grove, and bios, life.

A genus of but a single species, which does not occur outside of Europe. It is a very interesting insect, being our sole representative of this important family. It is generically nearly allied to *Zemeros*, a genus found in various parts of the East Indies, Java, and China; but the elongated, acute, very hairy palpi, the pilose eyes, the strongly clavate antennæ, and the curious arrangement of the veins of the hind wings, separate it from all the adjacent genera. Looking at the series of European, or still more restrictedly, at our British butterflies, this species fills an important station between the butterflies with girted chrysalides, having fully developed feet in both sexes, and those butterflies in which the fore feet of the males are brush-like, all of which inhabiting Europe, have simple suspended chrysalides. This position was assigned to the genus, with admirable tact, by Dennis and Schiffermüller, in the "Wiener Verzeichniss," or Vienna Catalogue, more than a century ago.

NEMEOBIUS LUCINA.

Duke of Burgundy Fritillary.

LUCINA, Linn. Luc'ina, a goddess of women. Virg. Ecl. iv. 10.

Though this little butterfly bears the name of Fritillary at the end of its lengthy and important title, it belongs to a very different family to that of the true Fritillaries, and it has only shared their name on account of its similarity in colour and markings to those of the genus *Melitæa*.

It is chequered on the upper surface with tawny, and dark brown or black. The underside is reddish-brown, with black marginal dots, and two rows of whitish spots on the hind wings. The width across the wings varies from an inch to an inch and a quarter.

The egg is globular, shining, of a pinkish grey colour, and covered with very delicate, black, diamond-shaped reticulations.

The caterpillar, instead of being long and spiny, like those of the true Fritillaries, is short, thick, and of a woodlouse shape. Its colour is reddish-brown, or a pale olive brown, with tufts of hair of the same colour and black dots, black spiracles, and a greenish-yellow spiracular line. It feeds on the leaves of the primrose and of the cowslip, from June to September, when it then enters into the chrysalis state.

The chrysalis differs from that of the true Fritillaries as much as the caterpillar does, being attached by the tail, and with a belt of silk round the middle, to the underside of a leaf of the food-plant. In that state it remains over the winter. It is of a pale yellowish brown colour, with numerous distinct black spots and marks; it is short and stumpy, and covered with hair in the same manner as the caterpillar.

Lucina is common in woods in many parts of Central and Southern Europe, extending from the South of Sweden to the Northern parts of Greece and Turkey. It is generally distributed over England, but does not occur in the two counties at the north-eastern boundary—Durham and Northumberland. On the other side, it has been met with in the counties of Westmoreland and Cumberland. It has not been found in Ireland or the Isle of Man, and only in the extreme South-west of Scotland.

It was figured by James Petiver in his "*Gazophylacii Naturæ et Artis*," in 1702; and also in his "*Papiliorium Britannicæ*," 1717. Of it he writes, "*Papilio Fritillaria minor*. Vernon's small Fritillary. It's the least of all the Fritillaries yet known. Found in several woods round London."

Moses Harris, in his "*Aurelian*," published in 1775, writes "The Duke of Burgundy Fritillary, commonly called the Burgundy, is one of the four Fritillaries which want the silver spots, and is the least of them all. They always fly in woods not very high above the grass. Their most plentiful time of flight is about the middle of May. They are very nimble, yet I cannot say they are difficult to take."

In Ray's "*Historia Insectorum*," 1810, we read, "This was first observed by Mr. Vernon, about Cambridge, afterwards in Hornsea Wood, near London, by Mr. Handley, and by Mr. Danbridge at Boxhill, and is pretty common about Dulwich."

Why this little butterfly was named the Duke of Burgundy must remain a mystery, as the high sounding and sex-quipedalian name is by no means in harmony with the diminutive size of the species, but "*Parvum parva decent*," says the proverb. The Rev. F. G. Morris, in his "*History of British Butterflies*," informs entomologists generally "that it is not his province to

write a work on "Titles of Honour," nor to give any genealogical account of the Duke of Burgundy Fritillary. "So far, however," he goes on to say, "the name is appropriate in that dukes and these butterflies are alike somewhat rare, and from his blazon of the plate it will be seen that the latter, as is only ducal, have numerous quarterings."

This brings to a close the first division of the Butterflies, viz., "Succinctæ," consisting of those which have girted chrysalides, so called because the body is supported by a silken girth or belt.

The next division is called "Pendulæ," so called because the chrysalides are attached by the tail only, and swing in the air, with the head pointed towards the ground.

Family SATYRIDÆ.

This family is of considerable extent, and almost universally dispersed over the surface of the globe; the number of species found in Europe is, in fact, considerably greater than one-third of the whole of the European butterflies. With the exception of one genus, *Melanargia*, which contains the species known as Marbled Whites, the family consists of exceedingly dull coloured butterflies of various shades of brown, the underside of the wings being ornamented with eye-like spots.

So large a family has been divided into 60 genera, but as the differences are often very slight, most of them may be considered in the light of sub-genera or sections. A few species have been separated from *Satyrus*, and formed into a genus (*Pararge*), on account of the eyes being hairy, and yet the genus *Polyommatus* contains some species with hairy eyes and others with naked eyes.

GENUS XII.—MELANARGIA.

Meigen.

MELANARGIA, from Melan—black, and Argœ—silvery.

The generic name *Melanargia* was bestowed in 1829. Hubner, in 1816, named the genus *Arge*, but as *Arge* is the name of one of the species contained in the genus, and also the name of a genus in the order Hymenoptera, we cannot do better than adopt Meigen's name of *Melanargia*.

The species of this genus may be at once distinguished from all others of the family by the ground colour of the wings, which is white, more or less marbled with black. There are eight species, seven of them being European, the warmer shores of the Mediterranean being the home of the genus. Two or three are found in Asia, but only one, *Meridionalis*, is confined to that Continent. Only one is British.

MELANARGIA GALATHEA.

Marbled White.

GALATHEA, Linn. Galathea, a nymph beloved by Acis and the horrible Polyphemus.

The wings of this, the only British representative of the genus, expand from one inch and three-quarters in the male, to two inches and a quarter in the female. The ground colour is a creamy white, much marbled with black. On the underside, the pale tint very much preponderates, much of the black masses of the upper side being reduced to mere lines. The male has the underside of the hind-wings of a much whiter shade, and the female of yellowish shade. It may be readily distinguished from the other Whites by having only four walking legs, instead of the six which all the rest have, and also by the eye-like spots, most visible on the underside.

It is a variable species. Specimens have occurred almost perfectly white, and others almost black, the latter are not common in Southern Europe, but I have one taken at Dover, by Mr. Le Plastrier, and figured by the Rev. T. Bree, in "Loudon's Magazine," for 1832. The upper wings are nearly black above, except a large white spot near the base, and another tripartite at the lower edge; and beneath, both pairs are clouded with black, and almost destitute of the usual angular tessellated markings.

I have another which differs from the type in the ground colour being of a yellowish buff, with pale yellowish brown markings in lieu of black. This is the var. *β*. of J. F. Stephen's "Illustrations."

Specimens are also occasionally found in which the cream colour of the wings is replaced by pure white.

On the Continent, a curious form of the female is found, which Esper called *Leucomelas*. It has the underside of the hindwings without the black markings. The almost black form is called *Turcica*. Another form from the south-east of Europe is called *Procida*, and which Dr. Staudinger describes as *obscuria*. A fourth named variety is *Galeræ*, which wants the eyed spots. In the second volume of the "Zoologist," Mr. Thomas Marshall writes, "I took last July, on the heights between Dover and Walmer, a male of a clear milky white colour, and has neither on the upper or underside of the wings the smallest speck of black. Its thorax, body, and palpi are also entirely clothed with white. The specimen is in perfect condition."

The egg is large and ovate, and its shell looks like dull bone-white china, being covered all over with very shallow rhomboidal network, with very tiny knobs at the knots, and with a central patch of finer meshes on the top.—
Rev. J. Hellins,

The caterpillar is variable in colour, the most ordinary one being buff with darker dorsal and lateral streaks. Another is of a yellowish green, with red dorsal and lateral lines. It feeds on *Phleum pratense*, *Dactylis glomerata*, and other grasses; it hibernates when very small, becomes full-fed in June, and changes to a chrysalis without suspending itself in any way, or making a cocoon.

The chrysalis is very stout and plump, and of a pale, putty white colour, with a broadish yellow stripe down the middle, and the wing cases are freckled with pale brown.

M. Galathea is one of the most abundant butterflies in central and southern Europe (but does not occur in Spain or Portugal, Scandinavia, or the north of Russia), frequenting meadows and open places in woods, during the months of July and August.

In the British Isles, it is entirely confined to England, and does not occur at all in the more northerly counties, Yorkshire being the furthest north in which it is found. In the midland and more southern counties it is common enough where it occurs, but this is always very restricted. It has apparently a great partiality for the chalk downs of the south coast; roughish ground and broken pastures being also favourite habitats.

The first to record it as a British species appears to have been Dr. Christopher Merratt, F.R.S., for in his "*Pinax rerum Naturalium Britannicarum, continens vegetabilia, Animalia, et Fossilia, in hac Insula reperta inchoatus*," he gives the following description of a butterfly: "*Capite alisq, lacteis quibus maculæ furcæ et nigricantes*."

In his "*Historia Insectorum*," published in 1710, John Ray thus records it: "*Mense Junio circa Festum S. Joannis Baptistæ primo circumvolitantem observari hoc anno (1690) in locis palustribus et humidis præcipue. Verum ver valde frigidum erat. Hanc speciem D. Petiver in Mus. cent. 1. Papiionem leucomelanon appellat, Angl. Our Half-mourner. Apud nos circa Braintriam in Essexia frequentissima, nec rarior, ut puto, alibi in Anglia*."

In his "*Insects of Great Britain*" in 1795, Lewin writes: "This butterfly is to be met with in dry meadows or pasture lands. It does not range abroad, but is locally attached to the place where it was bred, so that it was common to see fifty, sixty, or a hundred on the wing in one meadow, and in the fields adjoining not one. It lays its eggs, scattering them about the meadows, and as the eggs are not glutinous, they drop among the grass, and rest in security, till the proper time for the caterpillars to make their appearance. The caterpillars are bred from the egg the latter end of July, and feed on meadow grass the remaining part of the summer. On the approach of winter they conceal themselves in the ground, and abstain from food till the

month of March, when they feed again on the young and tender shoots of grass. In June they arrive at their full growth, and change to chrysalides about the middle of the same month."

GENUS XIII.—HIPPARCHIA.

Fabricius.

HIPPAR'CHIA, from the Greek, signifying the command of the cavalry, probably given in consequence of the species being of the brown colour so common amongst horses.

The name *Hipparchia* was bestowed upon the genus by Fabricius in 1807; and the name *Satyrus* by Latreille in 1810. Saty'rus, a Satyr, a rustic deity, half man, and half goat. Virg. Ecl. V. 73.

The species are of various shades of brown, and generally have eye-like spots on one or both pair of wings. The caterpillars are pisciform, or somewhat like a fish, that is, attenuated behind, the tail ending in a small fork; in general they are pubescent but without spines: the head is more or less rounded, and sometimes heart-shaped.

It cannot create surprise that such a very large genus has been split into several. Kirby in his 1871 "Catalogue of Diurnal Lepidoptera" gives sixty. For our British species I shall retain three—*Melanargia*, *Hipparchia*, and *Erebia*. *Hipparchia* though, I shall divide into five sub-genera or sections—*Lasiommata* for the hairy-eyed species *Ageria* and *Megara*; *Hipparchia* for the largest species, *Semele*; *Satyrus* for *Janira*, and *Tithonus*; *Enodia* for *Hyperanthus*, and *Cænonympha* for the light brown species—*Typhon* and *Pamphilus*. The first corresponds to the section *Vicicoles*, of M. Duponchel, the second to his *Rupicoles*, the third to his *Herbioles*, the fourth to his *Ramicoles*, the fifth to his *Dumicoles*. *Melanargia* corresponds to his *Graminicoles*, and *Erebia* to his *Alpicoles*.

SUB-GENUS LASIOMMATA.

Westwood.

This sub-genus is at once distinguished from the rest by having the eyes thickly clothed with hairs, in addition to which the palpi are very slender. The antennæ are straight, distinctly annulated with black and white, and club pyriform. Sixteen species are known, two of them occurring in Britain. All of them are confined to Europe, Asia, and the north of Africa. This sub-genus corresponds with the first section of *Hipparchia*, of Curtis and Stephens, and contains Hubner's two groups, *Pararge* and *Dira*.

HIPPARCHIA ÆGERIA.

Speckled Wood

ÆGERIA, Linn. Æger'ia, a nymph, who was supposed to have favoured and instructed Numa Pompilius, third King of Rome. Ovid, Fast. III, 275.

This and *Leucophasia sinapis* (the Wood White), differ greatly from all our other British butterflies, in choosing shady habitations instead of the open situations so suitable to true children of the sun.

The wings expand from one inch and three-quarters to a couple of inches, and are of a dark brown, with creamy white patches of variable size, placed irregularly; the one nearest the tip of each forewing being ornamented with a white pupilled black eye-like spot, and three of them near the hind margin of the hindwings are ornamented in a similar manner. On the underside the hindwings are varied with lighter and darker undulations, and have a row of six white dots, varying in size, near the hinder margin. The females have the larger and more numerous spots.

Very few varieties are known. I have one, however, which has the white-centred black spots on the hindwings without the creamy white rings. A named variety, *Meone*, Cramer, has the creamy white replaced by orange or a tawny hue, and is the common form in Africa and the south of Europe. Another, very closely allied, *Ziphia*, Faber, is the Maderian form. Another with a bipupilled eye occurs in the Channel Islands.

The egg, which is deposited singly on blades of grass, is of a whitish-green colour; its shape is ovate, with upright sides and round top, without ribs, but with a very glossy shell, covered all over with fine irregular raised network.

The caterpillar, which feeds on *Dactylis glomerata*, and other kinds of grass, is of a dull brownish-green, with a darker dorsal and a paler spiracular line, covered with short hairs, which gives it a soft velvet-like appearance.

The chrysalis, which is suspended by the tail, is short and dumpy, and of a green or brownish-green, with markings of a darker shade.

There are apparently three broods of the butterfly during the year. The first is generally on the wing by the middle of April, sometimes earlier. In 1868, I captured it at large as early as March 25th, and it has been bred from the chrysalis as early as March 7th. The eggs, being laid, soon hatch, and the caterpillars become full-fed in June or July. By the end of the latter month the butterfly is again on the wing. The second brood of caterpillars may be found in August, and feeding up rapidly soon enter the chrysalis state, the third brood of butterflies appearing in September and October; in 1866, I met with it as late as November 2nd. The third brood of cater-

pillars hibernate when young, and feeding up in the spring, enter the chrysalid state the beginning of May. The April butterflies are probably produced from some of the second brood of caterpillars, which hibernate when almost full-fed, and enter the chrysalid state in March.

This is a common butterfly throughout the greater part of Europe, North Africa, and Western Asia. In the British Isles it is distributed more or less abundantly, with the exception of the Isle of Man and the extreme north of Scotland, the Isle of Skye being its northernmost limit.

It frequents shady lanes and woods, and is particularly fond of stormy weather, appearing in Dorsetshire in the wet summer of 1879, in the greatest abundance, but very sparingly in the dry summers of 1870 and 1887. The shady woods and wet climate of Dunegan, in the Isle of Skye, seems especially adapted to its requirements.

It was figured and described as long ago as 1633, by old Moufet; and also described in 1667, by Dr. Merrett in his "Pinax." Petiver in 1717, figured it in his "Papiliorum Britanniae Icones," calling it the *Enfield Eye*, from the place he first observed it in. Lewin in his "Insects of Great Britain" writes, "This butterfly is peculiar to woods, and may be seen flying as early as the middle of April. This brood is from the caterpillars that have lived through the winter, and have changed to chrysalis at the end of March, in which state they remain for about twenty days, when the flies are perfected. The caterpillars feed on grass, and go through the different changes exceedingly quick, so that there are not less than three distinct broods of the flies in one summer."

HIPPARCHIA MEGÆRA.

The Wall.

MEGÆRA, Linn. Megæ'ra, one of the Furies. Virg. Æn. XII. 846.

This is called the Wall Butterfly, from its fondness for settling on walls. It has also a partiality for banks and roadways. It belongs to the section *Dira* of Hubner.

The wings expand from one inch and three quarters to a couple of inches, and are of a brownish colour with a very large patch of a fulvous yellow on forewings, with transverse brown lines. Near the tip of each forewing is a large eye-like spot with a white pupil; and the hindwings have a row of from three to five eye-like spots varying in size, the middle ones with white pupils. The male has a broad oblique stripe on the forewings. The underside of the hindwings is beautifully freckled with yellowish grey and brown. It is very similar to *Mæra*, Linn., which has been erroneously recorded as British; and I possess a variety taken by Mr. Pretor, in August, 1856, at Sandesfoot

Castle, near Weymouth, which appears to be somewhat intermediate, the hindwings and the basal portions of the forewings being quite a pale brown, almost drab. A very curious variety is in the collection of Mr. Bond: the forewings are of the usual type, but have an extra small eyed spot close to the top. The hindwings are semi-transparent, with eyed spots on a fulvous band and slight fulvous marks nearer the base. Mr. Stephens, in his "Illustrations," describes a variety with the wings nearly transparent, the scales being sparingly distributed over the surface, but all the usual markings visible. Occasionally the characteristic dark band of the male is wider than usual, making the specimens look very dark; and I possess a specimen in which paler portions of the wings are almost white. Examples with more than three eyed spots on the hindwings are not uncommon. The underside has generally six or seven, but there are seldom more than four on the upperside. Sometimes the eye is bipupilled. The variety *Lyssa*, Boisd., from South-eastern Europe and Asia Minor, has the hindwings of a grey colour on the underside, somewhat like my specimen from Weymouth; and the variety *Tigelius*, Bon., from Corsica and Sardinia, is smaller and darker fulvous than the typical *Megara*.

The egg, which is deposited singly on blades of grass, is of a pale green colour at first, then whitish, at last dull greenish-white, with some dark purplish spots on the top. In shape it is somewhat truncated and conical, with rather a round top.

The caterpillar is of a dull green, with a darker dorsal and a lighter spiracular line, and covered with minute warts, each of which emits a short hair. It feeds on *Dactylis glomerata*, and other kinds of grasses.

The chrysalis is suspended by the tail, and has two varieties of coloration, green and a very dark brown. It has a short, stout, flattened, oval spike, the tip of which is thickly set with pale, curled spines.

The butterfly appears in May, in which month or early in June, the eggs are laid singly on grass stems. The caterpillar is full-fed by the middle or end of July, and the species remains a month—sometimes less—in the chrysalis state, the second brood appearing in August, and continuing to fly almost to October. The eggs are generally laid in August, and hatch in a few days, the caterpillars feeding during the autumn, and hibernating, enter the chrysalid state at the end of March or middle of April. About the end of March, 1881, the Rev. J. Hellins captured two caterpillars on grass; about the middle of April these became chrysalides, and the butterflies appeared on May 13th and 21st, these had come from eggs laid in the preceding July or August, and had hibernated as caterpillars. (See Buckler's Larvæ, appendix by Rev. J. Hellins).

It is found all over Europe, except in the polar regions, in Northern Asia, and Asia Minor, also in the north of Africa. It is, or at least was, a common butterfly in all parts of England and Wales, but appears to have become very scarce in the north of England, as Mr. Robson has only seen a solitary specimen since 1860 in the Durham district. Dr. Buchanan White makes the same remark in reference to Perth, adding "The series of cold summers following that year seem to have destroyed the species." In the south of England it is still a very common butterfly, and also in Ireland. It occurs in the Isle of Man, and is found in Scotland as far as Argyleshire.

The first English author who appears to have noticed it was Dr. Christopher Merrett, who in his "Pinax," published at London in 1667, described it thus, "Oculo nigro, pupilla candida, alisq; Dracontii modo varius," which means that it is freckled after the manner of Dragon-wort. Ray informs us "It is not unfrequently seen after midsummer," and calls it "the Golden Marbled Butterfly, with black eyes; but Petiver calls it the 'London Eye.'" Lewin informs us that it is very common in lanes, road sides, and barren places in woods, and that it frequently settles on the trunks of trees.

SUB-GENUS HIPPARCHIA.

This sub-genus corresponds to the section *Eumenis* of Hubner and *Rupiciles* of M. Duponchel; and contains forty species or more, including the largest of the family.

M. Marloy has published a short notice upon the caterpillars in the "Annales" of the French Entomological Society for 1838, stating that the chief cause why they are so seldom met with is that they conceal themselves and remain inactive during the day, but come forth to feed by night, when they may be found in great numbers with the help of a lamp. The caterpillars of *Circe*, *Briseis*, *Fidia*, and *Semele* form large cocoons underground, composed of grains of earth fastened together with a little silk. Their chrysalides are short, ovoid, glabrous, with the head obtuse and tail pointed.

Another point of distinction may be seen in the perfect insect, which has the antennæ with a short abrupt club.

HIPPARCHIA SEMELE.

Grayling or Black-eyed Marble.

SEMELE, Linn. Sem'ele, the mother of Bacchus, the God of wine.

This fine butterfly is the largest British species of the family, some of the females measuring two inches and three-quarters in expanse. The males are

smaller, being as a rule half or quarter of an inch less across the wings. Though a powerful looking insect, its flight is by no means swift, and it is captured without much difficulty. The upper surface of the wings is of a dull brown, with a broad, wavy, creamy white band near the hind margin. In this band are a couple of white centred, black, eye-like spots on each forewing, and a smaller one near the anal angle of each hindwing. The female has the band very distinct, but it is very indistinct on the forewings of the male, and on the hind wings a fulvous tinge. The underside of the forewings is of a creamy white, with a fulvous tinge; the underside of the hindwings is clouded with white, brown, and black, the base darkest. The antennæ are brown above, with the under part ochraceous. The intensity of its colourings varies greatly. In some specimens the upper surface is nearly black; in others the marginal band is nearly flavescent, with a few brownish clouds; beneath, the anterior wings are frequently very deep brown at the base, with a dusky bar across the centre, and the hind-margin of the same colour; and the posterior wings are occasionally marked with a zig-zag, irregular, central ochraceous band. The eye-like spots also vary very much in size. Scotch specimens are larger and darker than those from the South of England. Many Irish examples are much redder than the type, and closely resemble those from Portugal and the north-west of Africa. A variety, *Aristæus*, with the paler portion of the wings yellower than the type, occurs in Corsica and Sardinia. Another, *Mersira*, has the underside of the hindwings uniformly grey, instead of being marbled and mottled as in the ordinary type, and is found in Cyprus and in Asia Minor.

The egg appears never to have been described.

The caterpillars, when young, are ochreous, with a black interrupted dorsal line; when full-grown they are an inch and a half in length, tapering much to the anal forked extremity, and a little towards the head, which is globular. It is of a delicately mottled drab colour, with darker stripes. The dorsal line is olive-brown, and the spiracular line pale ochreous-brown, edged with brownish-white both above and below. The head is brown, on it the principal stripes of the body are delicately marked with darker brown. The legs are of a drab colour, and the spiracles are black. It feeds on *Aira præcox* and *cæspitosa*, and other kinds of grasses; and is remarkable for changing to the chrysalid state below the surface of the ground in a slight cocoon.

A captured caterpillar, which had been dug up by Mr. Buckler, on May 20th, 1864, from a waste piece of sandy ground near the sea, amongst early hair grass (*Aira præcox*) and other small grasses, on being placed under a glass in a pot, immediately burrowed in the sandy earth, and the few times it

was seen on the grass were always at night, and each morning brought evidence of its doing well by the diminished grass.

The chrysalis, like most other subterranean chrysalides, is deep dark red in colour, and smoother and more regular in shape than its congeners.

The butterfly emerges in the end of June, more frequently about the middle of July, and continues on the wing till past the middle of September. The eggs are generally laid in August, and are deposited singly on the food-plant, and hatch in a few days. The caterpillar feeds very slowly in the autumn, and hibernates when quite small. It feeds up in spring, and is not difficult to find at dusk, or often dark with the aid of a lantern, as its pale colour contrasts well with the grass stems. Lewin states that "it rarely ventures out to feed, except in the evening, for fear of birds, which are always searching for this kind of caterpillar." It becomes full-fed about the middle of June, and remains nearly a month in the chrysalis state.

Hipparchia Semele is found throughout Europe except in the Polar regions. It is also found in Asia Minor, and in Algeria and Morocco in Africa. It is considered a local species in Britain; but this is most likely only because the country is so highly cultivated. In England it occurs in nearly all our counties, and often abundantly. It is generally distributed throughout Ireland and the Isle of Man. In Scotland it occurs as far North as Sutherland, Scottish specimens being slightly larger and darker than English ones. Although rather local in Perthshire, it is an abundant species where it does occur. Its favourite haunts are warm rocks, such as Kinnoul and Moncrieffie hills, and in such situations it is very common. It appears to be attached to heaths and dry pastures, but is sometimes found in dry woodlands; and is easily taken, as it is not active in flight, and settles on the bare ground when it possibly can. Sometimes it settles on the trunks of trees, or on rocks.

The Rev. John Ray appears to have been the first to record it as a British species. In his "Historia Insectorum" he writes thus, "Hæc à D. Tillema Bobarts ad me transmissa est. Huic similis anno 1697, miki communicata est ab ingeniosissimo viro D. Davide Kreig M.D. Annabergensi Saxone, in collibus Gogmagog dictis agri Cantabrigiensis inventa, &c."

Petiver in his "Gazyophylacium," 1704, calls it "The Tunbridge Grayling," and adds, "it is very rare about London."

Wilkes, in his "Aurelian," 1742, calls it "The Rock Underwing," and informs that "it is taken near Coombe Wood, in July."

SUB-GENUS SATYRUS.

Boisduval.

SATYRUS, a rustic deity, half man and half goat. Virg. Ecl. v. 73.

Contains the sections *Epinephile* and *Pyronia* of Hubner. Of the first, we possess one British species, *Janira*; and of the second likewise one, *Tithonus*. According to Kirby's Catalogue, 26 species belong to this Sub-genus, from various parts of the globe, five of them occurring in Europe.

The hindwings are slightly dentated, and the antennæ are gradually clubbed. The male has a broad black streak on the forewings, which distinguish it from the next sub-genus. The underside is of a fulvous colour generally. The caterpillars are spindle shaped, and covered with fine hair.

HIPPARCHIA JANIRA.

Meadow Brown.

JANIRA, Linn. *Jani'ra*, one of the Nereids.

This most abundant species varies in the expansion of its wings from one and a half to two inches, the female being the larger. As its English name implies, the prevailing colour of the wings on the upperside is brown, of a very dark shade, especially in the males. Both sexes have a black eye-like spot, with a white centre inside of a fulvous ring, near the tip of each forewing; and the female has, instead of the ring, a large fulvous patch, which is sometimes also slightly visible in the males. The underside of the forewings is fulvous; of the hindwings greyish brown, with a paler band towards the hind margins, which is marked with two black dots in the male. The markings vary greatly in size, as well as in colour; and the eyed spot is sometimes without any, and sometimes with two white dots, occasionally also it is accompanied by a secondary eyed spot above, and a black spot or two beneath. Linnæus mistook the sexes of this butterfly for different species, to which he gave the names of *Janira* and *Jurtina*, but their specific identity has long been established. In such cases the name given to the male specimens is retained if that of the female. Although the female as a rule is very distinct, yet it occasionally appears with all the coloration of the male.

This species is exceedingly subject to variation of a very peculiar kind, namely, in the presence of large blotches, or sometimes of an entire wing, having the appearance of being bleached, the usual brown colour being absent in such blotches, and a kind of dingy white appearing in its stead. Various suggestions have been made to account for these white varieties, that most generally received being that the discolouration has been caused by the rays of the sun, concentrated by a drop of dew. "I cannot see," writes Mr. Robson, "that the explanation is satisfactory, for the bleaching is as often on the hindwings as on the forewings, and as the one covers the other in the chrysalis, the hindwing would not be bleached from this cause, with-

out that part above it being also affected. Besides if a dew drop could thus concentrate the rays of the sun like a burning glass, the chrysalis would be first affected, and the insect so injured as not to be likely to emerge." Mr. Robson has seen no other species marked in the same way, except one specimen of *Erebia Blandina*, in his own collection, which has the left wing so affected; but Mr. Mosley has figured a specimen of *Thecla rubi*, from Mr. Gregson's collection, which may decidedly be called bleached. In the British Museum is a singular specimen of this variety of *Janira*, which is remarkable for the confluence of the discoidal patches on the forewings. The most beautiful I have of these bleached examples is a male, which I captured at Glanvilles Wootton, on June 28th, 1864. The specimen is apparently fresh from the chrysalis, and what is left of the dark colour is of a very rich dark brown indeed, being mostly at the base and round the margins. All the wings are coloured in a similar manner, and on both the upper and undersides; the eyed spot being almost hidden. Four other males I have of this kind. One has the right wing white, other wings of the normal type. A second has the two right-hand wings almost white. A third has a white patch near the hind margin of both left-hand wings. A fourth has a slight white patch on the two forewings. Females of this variety are more scarce, but I have one which I took at Glanvilles Wootton, on July 2nd, 1872, with the right-hand forewing entirely white, and the eyed spot scarcely showing. Mr. Tugwell has a very remarkable example with the right forewing quite white, with the exception of the eyed spot, and a few yellowish streaks near the centre. The hindwings on the same side have a yellowish-white band, corresponding with the pale band of the underside. The wings on the opposite side are very different, the forewing being marked more like the ordinary female, but yellow instead of fulvous, while the hindwing resembles that on the right side, except that the band is yellow instead of white. A female I took at the Land's End, in August, 1864 (the great year for bleached varieties), has the fulvous patch on the forewings replaced with yellowish-white. Another very extraordinary form is what may be called the drab variety. It has all the wings of a very pale brownish drab, with the eyed spot scarcely showing. The finest specimen of this variety I captured at Glanvilles Wootton, on June 20th, 1864; being singularly enough the first of the species I saw in that season. Another very extraordinary form has all the wings of a very pale ochraceous, except a fulvous patch, in which the eyed spot is situated. It was taken by my father in the Isle of Arran, on July 29th, 1825. A female I took in the Isle of Harris, on July 29th, 1883, has a distinct fulvous band on the hindwings. The undersides of the males from that locality are unusually dark. Perhaps these belong to the variety named in

the "Scottish Naturalist," as *Splendida*, by Dr. Buchanan White, who describes it as follows: "Larger and brighter coloured, the apical spot of the front one with two white dots (mine has only one). Found by Mr. Davidson in the Island of Longa, on the west coast of Rosshire, being the only form occurring there." He goes on to say, "that it occurs occasionally in Aberdeenshire; and that he has taken it in the island of Capii, near Naples." The South European variety, *Hispulla*, Hubner, is a large richly coloured form, expanding nearly two inches and a half; the black spot at the tip is very large, the light markings of a deep orange tawny, and the veins broadly black, the hindwings too have a distinct tawny band. It has been reported as being taken in Hayling Island, but the specimen is more probably like my female from the Isle of Harris. The Algerian form, *Janiroides*, which is also said to occur in Spain, has a row of small brown dots in yellow rings on the underside of the hindwings. In the Corsican form, *Nurag*, the male is brown with a fulvous blotch on each wing, and the eye spot surrounded with fulvous; and the female is fulvous, the underside of the hindwings is uniformly brown, without paler markings or black dots.

The egg is yellowish-white with brownish markings. It is globular, and has lines on its surface like the meridian lines on a geographical globe, and a pretty scalloping at the top that gives a flower-like appearance to that portion.

The caterpillar is of an apple green colour, with a darker dorsal line, and a yellowish white stripe on each side, and white anal points. It is covered with roughish looking warts, which emit short hairs. It feeds on grasses of various kinds, preferring the soft meadow grasses to the coarser species.

The chrysalis is suspended by the tail to a blade of grass, but often so slightly that it falls to the ground. The shrivelled skin of the caterpillar remains, enveloping the tail of the chrysalis, and supporting it. The chrysalis is stout, with two little horns on the head; the tail ends in a short, stout sword spike, on the tip of which are a few straight feeble bristles. The colour is green, with some brown spots and lines.

Two species of parasitic Hymenoptera have been bred from it, namely, *Ichneumon reptermis* and *Apanteles nothus*.

This butterfly begins to emerge at the end of June, and continues on the wing for some time. Specimens may be seen even as late as the middle of September, and during the greater part of this time the female may be noticed laying her eggs. Near the railway station at Ventnor, in the Isle of Wight, I captured some specimens in 1866, on the 11th of October, and at Dover they have been seen as late as October 29th. They evidently belong to a second brood, as the specimens are beautifully fresh. The eggs are laid singly on the grass blades, and hatch in about a fortnight. The caterpillars

feed slowly for a short time, and then retire for hybernation. With the warm weather of May it comes from its retreat, and becomes full-fed by the end of the month or early in June. It is seldom seen in the day, as it feeds by night, when it may be easily found with the aid of a lighted lantern, or a sweeping net. It remains in the chrysalis state three or four weeks.

Hipparchia janira abounds everywhere in grassy places throughout Europe except in the Polar regions, in those portions of Asia bordering on Europe, and in Northern Africa. It does not occur at any great elevation above the sea.

It is the commonest of all our British butterflies, and is found everywhere, except on high mountains, and the Orkneys and Shetland Isles, and perhaps Caithness and some of the Hebrides. Mr. Knapp, the author of the pleasing "Journal of a Naturalist," notices that it appears but little affected by the diversity of seasons, being equally copious in damp and cheerless summers, as in the driest and most arid ones. Indeed in 1826, which was exceedingly parched, the number of these butterflies was so great as to attract the attention of different persons. In 1867, it was rare in the Rannoch district.

It has a peculiar habit, in a stormy summer, of forsaking the grass at evening, and retiring to roost amongst the branches of oaks and other trees in large numbers. The following morning it returns to the grass.

It was first described as a British species by Dr. Christopher Merrett, in his "Pinax," 1667.

Lewin, in his "Insects of Great Britain," 1795, writes "The female lays her eggs, not fixing them to any particular plant, but dropping them here and there on the earth. The caterpillars conceal themselves at the bottom of the grass when young, and there feed; as they advance in size, they venture out in the evening, and feed more generally. I have no doubt but this cautious manner of feeding is their great protection from their enemies—the ichineumon fly and birds. This will in some measure account for the smooth caterpillars, and those with little hair on them, being so seldom seen, as they mostly conceal themselves in the day-time. Some of the caterpillars, which have grown fast, and were produced from eggs laid early in the season, change to chrysalis at the end of the summer, and will sometimes appear on the wing late in the autumn."

HIPPARCHIA TITHONUS.

Hedge Brown.

TITHONUS, Iinn. Titho'nus, the husband of Aurora, the fair and beautiful messenger of the approaching sun, fabled to have been transformed by her into a grasshopper.

The forewings are of a fulvous colour, with a dark brown border, the base being also slightly clouded with brown, and near the tips is a black eye-like spot, with a couple of white dots inside. The hindwings are of a dark brown with a fulvous band across the middle, and a white centred black spot near the anal angle. The underside of the hindwings is of a golden brown at the base and margin, with an irregular waved greyish buff band running across the middle, and a patch of the same colour near the outer angle, and a row of white dots. The size of these dots, as well as their number, varies in different specimens. The width across the wings varies from one and a half to a couple of inches. The male is distinguishable from the female by its slightly smaller size, more obscure colouring, and by having a broad brown oblique patch, extending from the inner margin to beyond the middle of the forewings.

Varieties are scarce, and none have been named. One of the most extraordinary is in the collection of Mr. Stevens. It is a female, and of the usual coloration, except that the dark border is replaced by one of pale drab, into which the fulvous of the centre portion of the wing is gradually shaded. Mr. Bond has a male, from the New Forest, with the fulvous portions of all the wings changed to pale drab, and females of the same character are in a few other collections.

The egg is cylindrical, standing on end, the top flat, the sides with sixteen ribs separated by wide grooves. At first it is of a very pale yellow, but just before the caterpillar is hatched, it becomes pale purplish with dark markings.

The caterpillar is of a bright green or else of a pale stone colour, with a dark reddish dorsal line widening on the middle segments; a white sub-dorsal line interrupted at each segment; and a white spiracular line, bordered above with brown and shading into the ground colour. The whole body, head included, is closely set with fine short pale bristles; the oval flap with two short spines pointing backwards. It feeds on *Poa annua*, *Dactylis glomeratus*, and other common grasses.

The Chrysalis is suspended by the tail to a blade of grass. It is short and rather thick, and is of a very pale green, or of a pale drab colour, with numerous black lines and markings. The head ends squarely, whether looked at sideways or from above; viewed from below the corners are angulated almost like two little horns; the shoulders of the wing cases are also sharply angulated.—(Rev. J. Hellins).

Two species of parasitic Hymenoptera have been bred from it, namely *Rhagas tristis* and *Apanteles nothrus*.

The butterfly emerges from the chrysalis about the middle of July, and continues on the wing for a couple of months.

The egg is laid on blades of grass in July or August. The young caterpillar emerges in about a fortnight, and feeds very slowly for a while, retiring to hibernate among the grass stems near the ground. It may be found again in May, or even in April, at dusk or after dark, by the aid of a lighted lantern, and is full-fed in June, when it turns into a chrysalis, in which state it continues for three or four weeks.

The little section *Pyronia*, to which *Tithonus* and a couple of other species belong, is principally located in South-western Europe. This species is the commonest and most widely distributed over Europe and Western Asia, but is absent from Scandinavia, as well as the greater part of Eastern Europe. It is generally distributed throughout England, frequenting hedgerows and bushy places, but not open fields like *Janira*. In Scotland it is local and not common, being recorded from Kirkcudbright, Perthshire, and the west coast of Rosshire. It apparently does not occur in the Isle of Man, and is not generally distributed over Ireland.

Dr. Merrett briefly described it in his "Pinax, 1667."

James Petiver, in his "Papilionum Britanniae Icones," published in 1717, states "that it is seen about hedges in August."

Lewin, in his "Insects of Great Britain," 1795, informs us that "*Tithonus*, is a common species, and frequents the sides of hedges and the environs of woods, when on the wing."

Haworth, in his "Lepidoptera Britanniae," describes it under the name of *Pilosella*, Fabricius.

SUB-GENUS ENODIA.

Hubner.

This sub-genus or section was formed by Hubner for the reception of *Hyperanthus*, which differs from the preceding by the hindwings not being denticulated, and by having very hairy and elongated palpi. There is also some difference in the situation of the second branch of the post-costal vein of the forewings.

HIPPARCHIA HYPERANTHUS.

The Ringlet.

HYPERANTHUS, Linn. Hyperan'thus, probably a typographical error for Hyperanthes, a son of Darius, who fell at Thermopylae.

This plain-coloured butterfly varies in the expanse of its wings from one and a half to a couple of inches. The upper surface of all the wings is a very dark brown or almost black, without any shade or markings, sometimes with

one or more ocellated spots, which are small and faint in the male, but larger and more conspicuous in the female. On the underside, the ground colour of the wings is rather paler, but uniform, and there is a row of white centred black spots yellow rings, or ocelli, near the hind margin. The underside varies greatly in the size and number of the ocelli.

In his "Illustrations of British Entomology," J. F. Stephen's gives the following varieties :—

Var. *b*. Anterior wings beneath with three very large ocelli, posterior with five ; several on all the wings sesquialterous, or having smaller ocelli attached.

Var. *c*. Wings ocellated as in type, but the ocelli large and conjoined.

Var. *d*. Wings ocellated as in type, but the ocelli very minute.

Var. *e*. Ocelli in number as before ; the smaller or hinder ocellus on the anterior wings bipupillate, the inner one on the posterior wings nearly obsolete.

Var. *f*. Ocelli entirely obliterated ; in lieu thereof three snow-white spots on the anterior wings beneath, and five on the posterior.

Var. *g*. Anterior wings with three ocelli beneath, posterior with four, the one at the anal angle being obliterated.

Var. *h*. Anterior wings beneath with three ocelli ; posterior with four white spots.

Var. *i*. Anterior wings with three ocelli beneath ; posterior as in type.

Var. *j*. Anterior wings as in the last ; posterior with four ocelli, the inner one being obliterated.

Var. *k*. Ocelli in number as in the last, the anterior costal one on the posterior wings wanting.

Var. *l*. Anterior wings with two ocelli beneath, posterior with three ; the costal and anal ones wanting.

Var. *m*. Ocelli obliterated ; anterior wings beneath with two white dots ; posterior with four.

Var. *n*. Anterior wings with a single ocellus beneath, posterior with five.

Var. *o*. Anterior wings as in last ; posterior with four ocelli, the anal one obliterated.

Var. *p*. Anterior wings same as last two ; posterior with three ocelli as in var. *l*.

Var. *q*. Ocelli obliterated ; anterior wings with a single minute white dot beneath, posterior with four.

Var. *r*. Ocelli obliterated ; anterior wings immaculate ; posterior with three minute white spots.

Exclusively of the above, there are numerous intermediate varieties in the

magnitude of the respective ocelli; and the wings are frequently differently ocellated on the left and right sides. Mr. Stephens goes on to add "that the above are all that he possesses, and has had an opportunity of examining."

The form in which the eyed rings are represented only by the white dots of the centres, is called *Arete*, Müll., or else *Polymeda*, Hubner; and in Dr. Staudinger's large catalogue the only locality given for it is the Valley of the Amoor, but it is met not uncommonly at Dover, and it also occurs in Hampshire, Dorsetshire, Yorkshire, and other parts of England. Mr. Wailes had a specimen without any spot whatever, taken in Durham, Mr. Robson has another; and Mr. Kirby has one, taken in Germany, in which the outer half of the fore-wings, and the edges of the hind-wings, are grey instead of brown. These varieties are extremely interesting, as showing how a character, formerly supposed to be of specific value, can be modified, and indeed entirely lost, without inducing the slightest doubt as to the propriety of uniting all these dissimilar individuals under one specific name.

The egg is of a yellowish white colour at first, but soon turns to a pale brown, the shell remains clear and shining. It is dumpy, conical in shape, with rounded top, and very faintly reticulated.

The caterpillar is of a pale straw colour, with a dark brown dorsal line, which is broadest and most distinct at the anal segments, gradually narrowing and becoming fainter as it approaches the head. It is spindle shaped, and covered with roughish warts, which emit short white hairs. It feeds on *Triticum repens*, and other common kinds of grasses.

The chrysalis is short and very obese, with a rather rounded head; and of a pale brown colour, with spots and markings of a darker shade. It is suspended by the tail to the lower part of a blade of grass, but often so slightly that it falls on to the ground, where it remains.

The butterfly emerges from the chrysalis in the early part of July, and continues on the wing until August. The egg is laid singly on the grass stems, and hatches in about fourteen days. The young caterpillars feed very slowly during the autumn, and conceal themselves at the roots of the various grasses on which they feed, but crawl out again and recommence feeding very early in the year, and by the end of March are often half-grown. They feed during the night and cannot readily be found, unless diligent search be made with a lantern, among the long grasses so commonly growing along the hedgerows and ditches, more especially in the neighbourhood of woods. Towards the end of June they attach themselves by the anal claspers to a slight web, and hanging with the head downwards: are transformed into chrysalides.

The Ringlet is common in woods throughout Europe, except the extreme

north. It occurs also in Asia, but only in some of the districts bordering on Europe. It is widely distributed in the British Isles, but as it frequents woods and wooded districts, is rather local, and has not been observed in the Isle of Man. In Ireland it is very local, but occurs very abundantly in Galway. In Scotland it does not occur in the more mountainous parts. Duncannon in the Isle of Skye, is the most northern locality in Britain at present known for the species.

It is first described as a British species in "Merrett's Pinax," published in 1667.

In his "Papilionum Britanniae Icones," 1717, Petiver records it as rarely appearing before August, and mostly near rivers.

In Lewin's "Insects of Great Britain," 1795, we read: "Caterpillars that feed on the leaves of trees, shrubs, or bushes, are readily discovered by beating the boughs into a sheet; but those that feed on herbs, or grasses, that grow close to the surface of the earth, are not to be obtained but by the most diligent search under the cover that the leaves or roots afford them; and as the caterpillars in this section do not keep together, but are dispersed, and live in a solitary manner, they are but rarely to be met with. This is a common insect, frequenting the skirts of woods, and the sides of hedges."

SUB-GENUS CÆNONYMPHA.

Hubner.

This genus or sub-genus includes between twenty and thirty species, the greater part of which are European, two occurring in Great Britain.

They are all of a pale drab or tawny colour, and comprise the smallest of the family. All the three nervures of the fore-wings are dilated at the base, and the antennæ are slender, with a long and fusiform club. The middle pair of tibiæ are as long as the tarsi. The caterpillars differ from those of the other sub-genera in being completely glabrous and shining. A couple of species, *Hero* and *Arcanius*, have been erroneously recorded as British.

CÆNONYMPHA TYPHON.

Large Heath.

TYPHON, Rott. Ty'phon, last of the sons of Terra, a giant on whose shoulders grew an hundred serpents' heads.

This is an exceedingly variable butterfly, especially on the underside, and as may be supposed, two or three species have been made out of one; permanent varieties seeming, as in the case of *Polymmatas alexis*, to belong to particular localities.

The species varies in the expansion of its wings from an inch and a half to an inch and three-quarters. The upper surface of the wings of both sexes is of a brownish-white, the base being darker, and the fringe of a pale grey. There are rudimentary eyed spots near the hind-margin of the hind-wings, and also a rudimentary one near the tip of each fore-wing. The underside of the fore-wings is somewhat similar to the upper, except that the eyed spot is distinct, and that there is a distinct white bar near the spot. On the underside the hind-wings are of a silvery grey, with an irregular interrupted white bar across (the interruption forming the ground of the formerly supposed specific distinction; and there is a row of small eyed spots near the hind-margin, varying in number from two, to six or even seven. Sometimes there are as many as five on the fore-wings. The obliteration of the ocelli also varies much, in some specimens they are replaced by pale fulvescent or whitish spots, and in others they are almost obsolete. Again many specimens have the upper surface bearing very distinct ocelli, which vary in number from two to six. This form is the *Laidion* of Borkhausen, and is the same as that called *Typhon* in Kirby's "European Butterflies," and *Davus* in Newman's "British Butterflies"; and is the one found in Ireland, and most generally distributed in Britain, and on the Continent of Europe.

Var. *Polydama*, Haw. Differs from the preceding in the white bar across the under surface of the hind-wings being continuous, instead of interrupted. I have Haworth's original specimen, taken in Yorkshire by Mr. Watson.

Var. *Isis*, Thunberg. It is of a very much lighter shade, with the ocelli entirely wanting, or only traceable as pale dots, and the transverse bar is little different from the ground colour. It is the Lapland form, but occurs with the type in the Orkneys and the north of Scotland.

Var. *Philoxenus*, Esp., Manchester Ringlet. Is of a much darker hue *Laidion*, and the eyed spots are much larger and more distinct. The white transverse bar is generally continuous like that of *Polydama*, but sometimes interrupted like that of *Laidion*. Four, five, or even six distinct black, white centred spots, in pale rings, are on the underside of the hind-wings, and two or three on the fore-wings, and there is a like number on the upperside. This form is the *Philoxenus* of Esper, is called *Davus* in Kirby's "European Butterflies," and *Rothliebii*, in Newman's "British Butterflies," and occurs commonly on Chat Moss, near Manchester, and other parts of Lancashire; Thorne Moor, in Yorkshire; and other localities in the North of England. Dr. Buchanan White gives Cloak Moss, near Dalbeattie, as the only Scottish locality. It occurs on the Continent of Europe, but is probably only found in low-lying districts, and the caterpillar feeds on *Rhynchospora alba*, a plant which is often not a native of the localities frequented by *Laidion*. Some

specimens from Cumberland appear to be somewhat intermediate between *Laidion* and *Philoxenus*.

Professor Westwood remarks on these different varieties, that in *Davus* all the markings are complete, distinct, and unclouded; in *Polydama* they are somewhat paler and less defined; and in *Typhon* the broad band is divided into two irregular marks, while in further varieties some of the marks disappear altogether, and all are fainter. Also that *Davus* has the little rings always more or less defined on the upper surface, and is of a dull brown colour, with a slight inclination to grey, the darker parts inclining to green. *Typhon* and *Polydama* have the little rings very slight, and in some instances altogether wanting on the upperside, whilst also the ground colour is somewhat paler, and inclining to tawny, and on the underside all the marking are are paler and less distinct. The females are generally lighter than the males, with the ocelli on the upper surface larger and more distinct, and have a pale blotch on the upperside of the hind wings.

The egg is barrel shaped with the sides convex and delicately ribbed, and is of a pale straw colour very faintly blotched with pale brown.

The caterpillar is of a bright green, with a dark bluish-green dorsal line edged with pale lemon yellow, pale yellow sub-dorsal and spiracular lines, and brown spiracles, the caudal fork being tipped with pink. When full grown, it attains to an inch in length, the head being globular, and the body tapering towards the anal forked extremity. It feeds on *Rhynchospora alba*, and also on the various kinds of cotton grass, *Eriophorum*. The habits of the caterpillars differ much from those of the allied genera in being particularly active and lively, travelling much over their food-plant, an all-wise provision, enabling them to escape the inundations to which they are liable. (Buckler's larva of British Butterflies.)

The chrysalis is suspended by minute caudal hooks from a white silken web spun on the edge of a leaf of the food-plant. At first it is of a bright green, but, before the butterfly comes forth, changes to a dark brown.

The butterfly is on the wing from the end of June to the beginning of September. The egg is generally laid in July, and the caterpillars, as is usual with those of the family, hibernate. *Cænonympha typhon* is common, though somewhat local, on mosses and moors in Northern and Central Europe, Northern Asia, and Northern America. It has not been observed in the Isle of Man, but is extremely abundant in the South-west of Ireland, and in bogs of Connemera. In Britain, it ranges from the Shetland Isles to Chartby Moss, in Staffordshire. It is common at Rannoch, and in other Highland districts, and occurs on the Scotch mountains at an elevation of upwards of two thousand feet. It is also found in North Wales, and has been reported

from North Devon. The variety *Philoxenus* appears to be confined to the mosses of Lancashire and the neighbouring counties. Both *Laidion* and *Philoxenus* occurs in Yorkshire; for in the Entomologist for 1840-2, is the following paragraph, "I took *Hipparchia davus* at Thorne Moor, but wasted; and I had *H. typhon* given me from Cottingham, near Hull. In visiting the locality I find it differs from Thorne, where the original *Davus* occurs; Thorne Moor is mossy or spongy, but the Cottingham locality is reedy, as are all the spots where I found *Typhon* in Scotland: I consider them only local varieties."—J. C. Dale, August 13th, 1841.

The Cumberland specimens appear to be somewhat intermediate between the two; and in one of my specimens the white bar is wanting on the under-side of the fore-wings, therefore resembling the next species, *Pamphilus*.

In the Linnæan cabinet were four or five specimens ticketed "*Arcanius*," the last of which is set on the reverse side, and to it is a ticket with "*Angl. Hudson, rariss*" on it. It certainly is not *Arcanius* but *Typhon*; dark brown with scarcely any ocelli. It was probably taken in Wales by the celebrated botanist Hudson.

The variety *Philoxenus* was first recorded as British in Lewin's "Insects of Great Britain, published in 1795, under the name of the Manchester Argus—*Hero*, Linnæus,—with the following paragraph: "This butterfly was scarcely known in England till lately, when a gentleman found several in a moorish or swampy situation near Manchester; and from their local attachment to the same place, he takes them on the wing every year in July. The fly I have figured is from one in Mr. Francillon's magnificent collection of foreign and British insects." Donovan, in his "Natural History of British Insects," vol. vi., published in 1797, records it as "a local species: it is very abundant in some marshy parts of Lancashire; but we have not learnt that it has been taken in any other part of the kingdom. Many of the curious in London are particularly indebted to Mr. Phillips, of Manchester, for enriching their cabinets with *Papilio hero*, for though it is a plain insect, it is esteemed for its rarity, few entomologists having travelled into that part of the country to collect insects."

Both *Hipparchia arcanius* and *hero* are figured by Curtis, in his "British Entomology," from specimens said to have been captured by Mr. Plasted, on the borders of Ashdown Forest, Sussex; but as he also stated that he took *Chrysophanus chryseis* in Ashdown Forest, and *Acontia catena* at Brixton, Surrey, and also *Acontia calorii* in the neighbourhood of London, he cannot be looked upon in the character of a trustworthy personage.

Haworth, in his "Lepidoptera Britannica," records *Davus* from the museum of Jones, and as inhabiting the marches of Lancashire, near Manchester; and

Polydama and *Typhon* on being taken in the county of Yorkshire, and sent to him by P. W. Watson. Both *Polydama* and *Typhon* were taken on the 21st July, 1809, by the Rev. W. T. Bree, on the moors between Bald and Festiniog in North Wales; and Curtis records *Typhon* as being taken plentifully by himself and Mr. Dale in July, 1825, in the Isle of Arran.

CÆNONYMPHA PAMPHILUS.

Small Heath.

PAMPHILUS, Linn. Pam'philus, an Athenian, who robbed the public treasury.

The wings of this, our smallest British representative of the family, expand from the width of from a little more than one inch to nearly an inch and a half. On the upperside they are of a fulvous, or pale tawny colour, with brown margins, and a black spot near the tip of the fore-wings. In the males, the dusty edging of the wings is more decided than in the females. On the underside the fore-wing resembles the upperside, but the spot is much more distinct, being white centred, and in a yellowish ring; the hind-wings resemble those of *Typhon* without the ocelli, having in their place minute white dots. Varieties occur in which the ocelli on the underside are bipupilled, and others in which they are entirely wanting, sometimes also the upperside is without the spot. One in my collection, taken by Mr. Paul, at Langport, in Somersetshire, is of a whitish yellow tint, which makes the dark border appear very distinct. Another I have, has the ground colour very much darker than the type, similar to *Philoxenus*. In the large South European variety *Lyllus*, Esper, there are faint traces of marginal eyed spots.

The egg is somewhat bucket shaped, with flattish base and top, and upright sides, broader at the base than above; the sides with nearly fifty small irregular ribs, and faint transverse reticulation, the top thimble-pitted all over, the shell glossy, pale green at first, turning in a day or two to whitish, freckled and ringed with pale yellowish brown. (Rev. J. Hellins, in Appendix to "Buckler's Larvæ.")

The caterpillar is of a bright green colour, with dorsal line of a darker and spiracular line of a lighter shade, and pink anal points. It feeds on *Poa annua*, *Cynosurus cristatus*, and other kinds of grasses.

The chrysalis is suspended by the tail to a blade of grass. It is of a bright green colour, with minute white spots, rather broad and blunt at the head. At the end of the tail is a short, stout, rather flattened and curved spike, the tip of which is thickly set with curled spines, well adapted for holding on to the silk pad.

There appears to be two broods of this butterfly, the one appearing in May and the other in August. Possibly there are three broods, as the butterflies may be found from the end of April to the beginning of October. The caterpillars seem to hibernate in various stages of growth, and might probably be found all the year round. The Rev. J. Hellins had some eggs laid by captured females on May 28th, 1874. On August 11th one caterpillar had become a chrysalis. On August 22nd the butterfly appeared, whilst the rest of the brood were still caterpillars, and just then passing through a moult; and these hibernated in the caterpillar state.

Cænonympha pamphilus frequents all sorts of grassy places, heaths, railway banks, dry pastures, grassy lanes, &c., and is distributed all over Europe, except in the extreme north, and is found also in Asia and Northern Africa. It is distributed all over the British Isles, except the Orkneys and Shetlands, and is as yet the only species of butterfly reported from the small and far away Isle of St. Kilda,—

" Whose lonely race
Resign the setting sun to Indian worlds."

St. Kilda is the most westerly of the Hebrides, being 80 miles west of the Butt of Lewis.

Pamphilus was described as British as long ago as 1667, in the "Pinax" of Dr. Merrett.

It is recorded in Ray's "Historia Insectorum," 1710, as being very frequent in meadows through nearly the whole season.

GENUS XIV.—EREBIA.

Dalman.

EREB'IA, from Erebus, the region of darkness: in allusion to the dark colours of the butterflies contained in the genus.

The name generally adopted for the present genus was proposed by Dalman for the whole of the Swedish species of Satyridæ; it is consequently a synonym of *Hipparchia* and *Satyrus*; as such it was rejected by Professor Westwood, who proposed the name of *Oreina* in its stead, in allusion to the mountainous habits of the genus.

The species are very numerous, and are subject to great variations. They are distinguished by having the principal veins of the fore-wings either not swollen, or the costal vein alone slightly dilated at the base. The hind-wings are generally entire in the smaller species, and slightly dentated in the larger. The palpi are covered with long bristly hairs, and the antennæ are slender, with a rather long club. The caterpillars are covered with fine scattered hairs, and in shape are pisciform, like the rest of the family. The genus con-

tains about 60 species, of which about half are European. They are found almost exclusively in mountainous regions, and are rarely found on the plain, except where the vegetation has an Alpine character. They do not occur on the more northerly mountains of Europe, where they are replaced by the species of *Chionobas*; nor in the mountains of the southern parts of Spain, Italy, and the Mediterranean islands. Boisduval enumerates no less than seventeen species occurring on the Alps, and three species from Lapland. The extra-European species inhabit the mountains of Asia, North America, Chili, and South Africa; though, strange, to say, none are recorded from the mountains of North Africa. Two species only occur in Britain, although another, *Ligea*, was recorded as being taken by Sir Patrick Walker, in the Isle of Arran, as long ago as 1804. Mr. Stainton, in 1857, gave as his opinion in his "Manual" "that new species of British butterflies are more likely to occur in this genus than in any other," so many parts of the Welsh, Scottish, and Irish mountains having been unexplored. However it is in the southern counties of England, and not in the northern parts of our island, where new species have been turned up, and in the genus *Polyommatus*, not *Erebia*. The species of *Erebia* constitute Duponchels' ninth and last group, named, from their lofty habitations, *Alpicicules*; and may as that author suggests, be divided into two groups, from the entire and denticulated hind-wings, forming Stephen's divisions C and D of *Hipparchia*, and Hubner's sections of *Epigea* and *Melampias*.

SUB-GENUS EPIGEA.

Hubner.

The denticulated hind-wings distinguishes the species of this sub-genus from those of the next.

EREBIA MEDEA.

Scotch Ringlet.

MEDEA, W.V., Me'dea, a wicked sorceress who married Jason.

Fabricius, in 1794, named this species *Blandina*, but it is the same as the *Medea* of the Vienna Catalogue, published in 1776. Dr. Staudinger calls it *Æthiops*, Esp., and states that *Medea*, W.V. is another butterfly. If so it will be best to adopt the name of *Blandina*, Fab., for *Æthiops* is a bad name, being neither the name of a historical personage, nor yet of a food-plant; besides it has been given to two or three different species of butterflies; and according to Jung, the *Æthiops* of Esper is identical with the *Ligea* of Linnaeus. The wings expand from an inch and three-quarters to a couple of

inches. They are of a rich dark brown, with a fulvous band, containing several eye-like spot near the hind-margins. The female is paler in colour, and has generally more and larger spots than the male. The underside is paler in colour than the upper, and the fulvous band on the hind-wings is replaced by a white one. *Medea* varies in the extent of the fulvous band, and in the number and size of the eyed spots.

Stephens, in his "Illustrations," gives the following varieties :—

Var. *b.* Both sexes with the third ocellus from the apex of the anterior wing, blind.

Var. *c.* Both sexes with the third ocellus obliterated.

Var. *d.* Female with five ocelli on the band of the anterior wing.

Var. *e.* Both sexes with the third ocellus from the apex of the anterior wings blind, but the posterior wings with two ocelli only above.

Var. *f.* Posterior wings with only two ocelli.

Var. *g.* Ocelli very small, the third one being obliterated; the posterior wings beneath with five very distinct bands. The first at the base, pale dusky; the second, broad, bent, deep reddish brown; the next attenuated at each end, bluish-ash sprinkled with white, with three minute ocelli, and terminating at the anal angle of the wing; the hinder one occupying the posterior margin, and bright rufous brown. This is the form most frequently met with in Durham.

Var. *h.* With white dots instead of ocelli.

The Swiss specimens are generally larger than British, and their females have an extra eyed spot on the fore-wings. A named variety *Mensina*, H.S., has the fulvous band on the wings rather obscured.

The egg may be called large for the size of the butterfly, and is nearly globular, though somewhat ovate in shape and laid on end; the shell is glistening, and ribbed, but not deeply, with about thirty longitudinal ribs, and with very shallow transverse reticulations. At first, it is of a pale greenish yellow colour, afterwards of a pale pinkish grey sprinkled with claret brown. (Buckler's Larvæ.)

The caterpillar is of a pale stone colour, the warts being pale whitish brown; the dorsal stripe is blackish brown, most intense on the hinder segments, and enclosed by two lines of a paler shade than the ground colour, and a broad sub-dorsal stripe. The skin is covered, though not very closely, with short, stout, curved pellucid bristles.

The chrysalis is of a pale stone colour almost without markings, and very stumpy. It is not suspended by the tail, but the caterpillar goes down amongst the grass stems, and there changes. Before the butterfly emerges

the entire chrysalis becomes of a deep brown hue, the eyes being the first portion to change in colour.

The butterfly emerges about the last week in July, and continues about a month on the wing, but is soon worn. The eggs are attached singly to the blades of grass. They hatch in about ten or eleven days, and the caterpillar feeds a few weeks before hybernation; it then creeps down the blades of grass, which is generally *Aira præcox*, and hides in the thickest part of the tufts. About May it begins to feed again, and is full-fed by the middle or end of June.

Erebia medea inhabits the greater part of Central and Southern Europe, and Northern and Western Asia, but is wanting in the northern plains of Europe and in Silesia.

It appears to be generally distributed in Scotland, extending as far north as Ross-shire. It is only known in five northern counties of England, viz.: Durham, Westmoreland, Cumberland, Lancashire, and Yorkshire; and not at all in Ireland.

It is not so much a mountain species as others of the genus. In Scotland it has been noticed that it does not range more than 800 or 1000 feet above the sea level, while in Castle Eden Dene, Co. Durham, it is abundant at the sea level, and within a few hundred yards of high water mark. It frequents open grassy places among trees, but is sometimes extremely local. In one wood near Castle Eden it is abundant close up to the turnpike road, which passes through the wood, but it never occurs on the other side of the road: At Strathglass, in Invernesshire, it sometimes occurs in all the open weedy places in the woods, even coming into the gardens. From observation made there, it appears that *Erebia medea* was scarcely seen above 800 feet, while *Cænonympha typhon* attained an elevation of upwards of 2000 feet; the two species being found together from 200 feet up to 800 feet above the level of the sea.

It was first discovered to be a British species by Walker, who met with it in the Isle of Arran, in the beginning of August, 1804.

Sowerby, in his "British Miscellany," published in 1806, informs us that "This newly discovered species of *Papilio*, as a native of Britain, was caught in the Isle of Arran, one of the Western Isles of Scotland."

Donovan, in his "Natural History of British Insects," Vol. xii., published in 1807, writes: "This very rare species of *Papilio* has been recently discovered to be a native of the British Isles. About three or four specimens of it were taken in the Isle of Arran by Major Walker, to whose politeness we have an individual example at this time in our Museum. Another is preserved in the collection of our friend A. M'Leay, Esq., and these, we have reason to

apprehend are the only specimens at present in any of the London cabinets. Though but lately introduced to our attention as a native of Great Britain, this interesting insect is by no means unknown to the Continental naturalists as an inhabitant of Germany. It is the true *Papilio blandina* of the Fabrician system. This author likewise describes another *Papilio* under the same name, but it is an East Indian species, and belongs to the Nymphales tribe, and cannot be confounded with ours. He likewise describes another *Papilio* under the specific name of *Ligea*. This latter is, however, sufficiently distinguished by having four ocellated black spots in the rufous band on the upper wings instead of three, as in *Blandina*, and a white spot at the end of the band on the underside of the posterior wings, which the other has not. *Papilio ligea* was discovered in the Isle of Arran, by Major Walker, at the time as *Blandina*."

Stephen's, in his "Illustrations," writes of *Blandina*: "Discovered many years since in the Isle of Arran by Dr. Walker, and subsequently taken there by Sir Patrick Walker and Dr. Leach, and in profusion, in July, 1825, by Messrs. Curtis and Dale, the latter of whom supplied me with a fine series of both sexes. It has recently been found not uncommonly at Castle Eden, Durham: but the English specimens appear to differ considerably from the Scotch."

SUB-GENUS MELAMPIAS.

Hubner.

The species of this Sub-genus differ from those of the preceding in having the wings much more elongated, the hind pair being also entire and not denticulated. All are essentially Alpine or mountain species.

EREBIA EPIPHRON.

Mountain Ringlet.

EPIPHRON, Knoch. Epiphron, perhaps a grammatical error for Ephron, a Hittite, who sold to Abraham a plot of land to bury his wife in. Ephron is a Hebrew word signifying dust.

The wings expand from an inch and a quarter to an inch and a third. On the upperside they are of a rich dark brown colour, with a silky gloss; the fore-wings having an irregular transverse bar, or rather a band-like series of ferruginous markings running parallel to the outer margin of the wing, these markings are five or six in number, of which the second, third, and fifth always include a white pupilled black spot, the fourth rarely has the spot of equal size with the rest, it is generally reduced to a mere point and is often

entirely wanting. The hind-wings have three roundish ferruginous markings, equidistant from the outer margin, and each of these have usually a black central point, there is sometimes the trace of a fourth marking, but this is without the central point. On the underside the forewings are of a redder brown, with the red band marked with four black spots, whilst the hind ones are ashy or coppery brown, with three black spots, each surrounded by a slender red ring. Variations occur in the number and size of the spots as well as of the band. The female appears to differ but slightly from the male, it is, however, almost uniformly of larger size, and of less intense and rich colour, a difference often observable among the Satyridæ: the markings on the hind-wings are also more distinct. This is the form described by Mr. Newman, in the second volume of the "Zoologist," under the name of *Erebia melampus*, Boisduval, and is the one most frequently met with on the mountains of Scotland.

Var. CASSIOPE, Fab. Cas'siopé, the mother of Andromeda.

On the upperside the wings are of a rich dark brown, with a silky gloss, the fore-wings with a red fascia behind, in which are usually four obsoletely sub-ocellated black spots. On the underside, the fore-wings are of a pale metallic brown, with an irregular red band near the hind-margin attenuated in the middle, and having four black spots; the hind-wings are of a pale coppery brown, with three black spots, obsoletely cinctured with fulvous, placed opposite to the ocelli of the upperside. The cilia are brown above, white beneath; the body and antennæ are dusky, the latter nearly white underneath. This is the form most frequently met with on the mountains of Cumberland.

Mr. J. F. Stephen's, in his "Illustrations," gives the following varieties:

Var. *b*. The fascia on the anterior wings, above and below, with three ocelli-form spots, the third being obliterated.

Var. *c*. The fascia on the anterior wings on both sides with two ocelli-form spots, the third and fourth being obliterated.

Var. *d*. The fascia on the anterior wings with the apical ocellæ spot only.

Var. *e*. The fascia on the anterior wings unspotted; the posterior wings with three circular red spots, the one at the anal angle with a black dot.

Var. *f*. Anterior wings with four round red spots, with a black dot in each; the posterior with three, in lieu of the fascia.

Var. *g*. Anterior wings with four minute red spots, posterior with two. This is the *Papilio mnemon* of the Entomological Transactions, in which it was described by Mr. Haworth, about 76 years ago.

Var. *h*. Anterior wings with three very obsolete minute red spots, slightly pupillated; posterior with two.

Var. *z*. With the fascia of the anterior wings spreading towards the base, and forming an irregular patch occupying the greater portion of the disc of the wing; posterior wings with three round red spots in lieu of the fascia.

I have a variety from Scotland, in which the fulvous band is entirely wanting; and the fore-wings, in lieu of the red markings, have four black spots in white rings.

Epiphron is supposed to be distinguished from *Cassiope* by the black spots having white centres, but the Scotch specimens are as often without them as with these white centres, which, according to Dr. Staudinger, are found in the female. The Scotch specimens are larger than the English, and darker in colour. The fulvous markings are not so much of a band, but would be better described as a series of fulvous spots, divided by the wing rays, and having black middles, sometimes with white centres. Sometimes, however, these marks do form a band, while English specimens occasionally have it divided into spots. There are two other named varieties: *Melampus*, occurring on the Alps, which has scarcely any black spots; and *Pyrenaria*, occurring on the Pyrenees, which is larger than type, and has larger ocelli.

The egg is laid singly, standing on end, on grass stems, and is in shape cylindrical, being twice as long as it is wide, the sides with delicate and regular transverse reticulations, and the shell is slightly glossy. When first laid, it is of a bright yellow colour, but afterwards becomes duller, and is afterwards blotched pretty evenly all over with circular patches of small pale brown dots. (Rev. J. Hellins).

The newly-hatched caterpillars are flesh coloured, with ochreous flesh coloured heads, a faint purplish-grey tinge showing through the skin of their bodies. When older, they become of a grass-green colour, with numerous darker green longitudinal lines shading into the ground colour, and with a well-defined white line along each side in the region of the spiracles, which are brown. It is short and stout, with the swelling in a curve; the head is globular, and the tail as two short spines. It feeds on *Nardus stricta* and other grasses.

The chrysalis is little more than three-eighths of an inch in length, rather thick in proportion, being less dumpy in form than *Hyperanthus*, but more so than *Blandina*. The colour of the back of the thorax and wing cases is of a light green, rather glaucous; the rest of it is of a pale drab.

The butterfly is met with in June and July in swampy places at a considerable height, varying with the locality, and the particular variety of the species. The caterpillars, like those of the rest of the family, hibernate, when small, at the roots of grasses, and feed up in the following spring.

It inhabits many of the mountain ranges of Central Europe, including

some of those in Scotland, the lake district of the North of England, Croagh Patrick in Ireland, and the Pyrenees; but from other ranges, such as the Riesenebrige, Black Forest, and Jura, it is entirely absent; and it does not occur at all beyond Europe.

The first notice of the occurrence of this Alpine butterfly in England is from the pen of Mr. Haworth, and is published in the first volume of the "Transactions of the Entomological Society of London," in a brief account of some rare insects announced at various times to the Society, or new to Britain, and read on June 2nd, 1812. After describing it under the name of *Mnemon* (the Small Ringlet), Mr. Haworth goes on to say, "In Musæo Dom. Francillon, a captura Dom. Stoddart," and also informs us that it inhabits Scotland.

Although it has, since Mr. Haworth's time been found in Scotland, yet the specimens he alludes to, were taken, not in Scotland, but in the North of England, on the mountains round Ambleside, by Thomas Stothard, Royal Academician, on the 11th of June, 1809.

In his "British Entomology," Vol. V., published in 1828, John Curtis writes, "The males in froward seasons have appeared as early as the 11th of June; but last year, when Mr. Dale and myself visited Ambleside, they were later, the first being taken the 18th of June, and they did not become plentiful till the 25th. They are found amongst the coarse grass, that cover considerable spaces abounding with springs, on the sides of mountains; they fly when the sun shines, and their flight is neither swift nor continued, for they frequently alight amongst the grass, and falling down to the roots, their sombre colour perfectly conceals them. The females are lighter, and have even been taken in August. We found the males on Red Skrees, a mountain near Ambleside; and Mr. Marshall took them at Gable Hill and Styehed, between Wastwater and Borrowdale."

As it was formerly considered to be a very rare butterfly, the following passage in Stephen's "Illustrations of British Insects," published in 1828, will be read with considerable interest, as showing how long this insect was, from its rarity, but a reputed British species. "It was described by Mr. Haworth, about fifteen years ago, from specimens in the collection of the late Mr. Francillon, to whom they were presented by T. Stothard, Esq., R.A., their captor and the reputed discoverer of the insect in Britain. From the circumstance of so many years having rolled on without other specimens of the insect occurring, its native origin began to be questioned; but the past season has undeniably set the question at rest, through the instrumentality and industry of Mr. Dale, who was furnished with its locality from Mr. Stothard, and accompanied by Mr. Curtis, procured many specimens of the male

from the grassy sides of the mountains in the vicinity of Ambleside. The discovery, of the female is, however, due to an indefatigable collector—and one who disposes of the insects he collects—Mr. Weaver, of Birmingham, who found several of each sex, in different localities in the counties of Westmoreland and Cumberland, during the month of July.”

It was next turned up by Mr. Weaver, in 1844, on one of the Scottish mountains near Rannoch, in Perthshire. The butterflies appeared confined to a spot of level and rather marshy ground, about 150 yards in length and 50 yards in breadth; it was grassy but without heath, and although there was heath all round the neighbourhood, Mr. Weaver did not see a single specimen settle on it. The locality is among rocky mountains, some of which attain an altitude of 4000 feet above the sea, and the spot where the butterflies were found is at least 3000 feet.—“Zoologist.” It also occurs on Ben Nevis and on Ben Lomond, but is not found at a less elevation than 1600 feet.

Mr. Birchall captured a fine series in June, 1854, on Croagh Patrick, near Westport, in Ireland. The locality is about half-way up the mountain on the Westport side, in a grassy hollow, where a little hut is erected for the shelter of pilgrims.

Family DANAIDÆ.

This cannot, strictly speaking, be called a British family at all, as only a few wanderers of a single species, and that an American one, have been taken in England. One other species, *Danaïs chrysippus*, occurs in the extreme South-east of Europe.

The front pair of legs are rudimentary in both sexes; and the caterpillars possess one or more pairs of long, slender, fleshy filaments.

Although representatives of the family are found on all the Continents, the islands of the Indian Archipelago, and the Pacific Ocean, are most productive of the species.

GENUS XV.—DANAIS.

Boisduval.

DANAIS, a King of the Argives, and brother of Ægyptus; who sailed into Greece, and having expelled King Sthenelus, fixed his habitation at Argos, whence the Grecians were called Danai.—Virg. *Æn.* 2, 5.

All the species of this genus are large, and are generally of pale colours (often fulvous), with black borders, which are often spotted with white. The fore-wings are longer than the hind-wing, and the costa is arched. These

butterflies are distasteful to birds, their tissues being exceedingly tough and elastic, and they are generally abundant wherever they occur. The Australian variety of *Danaïs Limniace*, was found by Captain King in countless myriads, and is probably the same species as Captain Cook saw in far greater profusion in the neighbourhood of Thirsty Sound, on the 29th of May, 1770, when he found a space of three or four acres covered with millions of them on the wing, and every twig and branch loaded with almost equal numbers at rest. Herrera states "that on one day in June, 1494, there came to the ships of Columbus, then off the coast of Cuba, innumerable butterflies, so numerous that they obscured the sky, and continued passing until night, when a sudden storm of rain destroyed them." These were probably *Danaïs plexippus*, one of the commonest butterflies in North America, and known to possess immense powers of flight. In the evening and in cloudy weather they are found resting on the stems of herbaceous plants. They are never to be found in the thick parts of the woods and forests, but are common in the open spaces, and prefer meadows and plantations.

DANAIS PLEXIPPUS.

Anosia archippus.

PLEXIPPUS, Linn. Plexip'pus, one of the two uncles of Meleager, put to death by him, for disputing with Atalanta the possession of the boar's skin, which had been given to her.

All the wings have broad black margins, in which are situated two rows of white spots; and very conspicuous black veinings. The ground colour is fulvous, with a rather brilliant reflection. The underside is very similar. It may at once be known from any of our native butterflies by its superior size, being four and a half inches across the wings; and by the yellowish-white spots on the thorax.

The egg is laid singly on the underside of the leaves of various species of *Asclepias*. It is of a pale greenish yellow colour, and its form is compared by Mr. J. J. Walter to one of the projectiles for modern rifled guns, known as Palliser shot.

The full-grown caterpillar is about two inches in length, rather stout, and nearly cylindrical in form. The body is regularly annulated with black, opaque white, and bright gamboge yellow. On the dorsal surface of the third segment is a pair of slender, fleshy, slightly mobile filaments, nearly half-an-inch long, and a similar but somewhat smaller pair on the twelfth segment. It is a handsome and conspicuous creature, feeding quite exposed, and often stripping the *Asclepias* to the bare stalks.

The chrysalis is suspended by the tail among the leaves of its food-plant. It is of a bright translucent emerald green, with minute tubercles of the brightest golden hue. It is very short and dumpy, and abruptly truncate at either end.

Both the caterpillar and the perfect insect emit a faint and peculiar odour, which becomes strong and disagreeable when several caterpillars are shut up in a close box. Like all the *Danaidæ*, the insect in all its stages appears to be distasteful to every living creature, and is very tenacious of life, being known to exist in the butterfly state for fifteen months. In the United States, however, the caterpillar is subject to the attack of a dipterous parasite, *Maxicera archippivora*, Riley.

The original home of *Danaïd plexippus*, as Mr. J. J. Walker, R.N., informs us in the "Entomologists' Monthly Magazine," for March, 1886, is the American Continent, where it enjoys a very wide range, extending from Moose Fort, in Canada (lat. 50 20 N.), where snow lies on the ground for eight months of the year, to the Amazon region and Bolivia, or (if we regard *Eriippus*, Cram., as a geographical variety merely), to the estuary of the Rio de la Plata. Nearly everywhere throughout this vast region it appears to be abundant, and in Missouri the air is sometimes filled with the butterflies to a height of 300 or 400 feet. These vast swarms usually appear in the autumn, and some of them migrate southwards on the approach of winter.

Of late years this range, great as it is, has extended in a wonderfully steady and rapid manner across the whole breadth of the Pacific Ocean, and far into the Malay Archipelago. It is most abundant and firmly established in the Sandwich Islands, where it was unobserved by the early voyagers. In the Marquesas Islands, the first specimens appear to have been observed about the year 1860. It is found throughout the Samoan, Friendly, and Fiji Islands, being specially abundant in the latter group. It appears also to have reached the North Island of New Zealand, as well as Norfolk Island. In New Caledonia, where it has been long established, it became very abundant some years ago, but is now comparatively scarce, owing perhaps to the destruction of nearly all the food-plant by the caterpillars. We first hear of its occurrence in Australia in 1870, when Mr. Miskin ("Entomologists' Monthly Magazine") recorded its appearance in Queensland in numbers. It also now appears to be firmly established and common in the New Hebrides, Solomon Islands, and New Guinea; and has also been recorded from Celebes and Java. Starting from the eastern coast of America, we find *Danaïd plexippus* throughout the West Indies, in company with some curious local forms of the genus; and it has long been established in the Bermudas, 650 miles from the coast of the United States.

The first record of the occurrence of *Danaïs plexippus* in Britain is in 1876 (E. M. M., Vol. xiii. page 107), a specimen having been taken by Mr. Llewelyn, at Neath, in South Wales, on September 6th, of that year. Another was taken at Hayward's Heath, Sussex, on October 17th, of the same year. The recorder, the Rev. T. Crallan, in the "Entomologist" (Vol. ix., p. 264), states that for some two or three years there have been rumours of the appearance of an unusual butterfly in his neighbourhood.

Possibly these were not the first specimens taken in Britain, as probably those recorded by Newman, on the last page of his "British Butterflies," under the name of *Doritis apollo*, belonged to this species, viz., Sir C. Lemon wrote "that he had taken a specimen of *Apollo* in Cornwall, but suggested that it might have been imported with plants in his hothouse." "I beg to inform you that I yesterday met a gentleman who assured me that he saw *Apollo* at Hanwell, about six years ago."—Henry Austin, in "Zoologist," for 1856. "I have been to-day to see the person who took *Apollo*. He was lying on the cliff at Dover, in August or September, 1847 or 1848, when the butterfly settled close to him, and not having his net, he captured it by putting his hat over it. He had not the slightest idea what it was till he saw it figured in some work afterwards."—G. B. Wollaston, in "Zoologist," for 1856, page 5001.

A specimen of *Danaïs plexippus* is recorded by Mr. Jenner Weir ("Entomologist, vol. xix, p. 12), as having been taken near Snodland, Kent, on September 21st, 1881; but the number seen and caught in 1885 far exceeds all that have been previously noted. A round dozen, at least, have been recorded from our southern counties, Cornwall contributing quite half the number, though Devon, Dorset, and the Isle of Wight have also been favoured with the visits of the imposing stranger.

In 1886, a specimen of *Plexippus* was taken at the end of September in Pembrokeshire, about two miles from the coast; one at the Lizard; one near Swanage, in Dorsetshire; and another at Bournemouth. One was also taken on the 2nd of October in Guernsey.

Although upwards of twenty specimens of this butterfly are recorded as having been captured in South Wales, Cornwall, Devonshire, Dorsetshire, Hampshire, the Isle of Wight, Sussex, Kent, and Guernsey; only three have been reported from the Continent of Europe, viz., one in La Vendee, France, by Mons. Grassal, in September, 1877; one at Gibraltar, in October, 1886; and the other at Oporto, in Portugal, on September 29th, 1886; and some appear to have been observed in the Madeira or Canary group of islands.

It is wonderful to what great distances butterflies and moths are blown out to sea. *Plexippus* has often been seen flying at a great height more than

200 miles from the nearest land; and *Danaïs chrysippus* has been seen by Mr. Walker, strong on the wing, 700 miles from the nearest land, the coast of Africa. Mr. Jones records the arrival of a vast swarm of the small and feeble *Terias lisa* at Bermuda, which had evidently crossed more than 650 miles of stormy ocean, from the American coast; and a swarm of *Deiopeia pulchella* has been observed in Mid Atlantic, 960 miles from the Cape Verde Islands, the nearest land from which the moths could have come. Many American birds, not so strong on the wing as *Danaïs plexippus*, find their way from America to England, resting perhaps, crossing on one of the numerous vessels crossing the Atlantic.

Family APATURIDÆ.

This family has been erected for the reception of a few genera, which have been separated from the Nymphalidæ, to some of which the perfect insects are closely allied, by the peculiar shape of the caterpillar, which are without spines and from their great resemblance to a slug are called *Limaciform*.

It was an Indian species of this family of which Lord Byron sings:—

"As rising on its purple wing,
The insect given of Eastern spring,
O'er emerald meadows of Kashmere,
Invites the young pursurer near,
And leads him on from flower to flower
A weary chase and wasted hour;
Then leaves him, as it soars on high,
With panting heart and tearful eye."

* * * *

"The lovely toy so fiercely sought
Has lost its charm by being caught,
For every touch that wooed its stay
Has brushed its brightest hues away."

These lines may recall to our minds other lines also by Byron:—

"Maid of Athens, ere we part,
Give, oh give, me back my heart."

Moore, also, has introduced these insects amid the splendour of "The Light of the Harem."—

"And they, before whose sleepy eyes,
In their own bright Kathair bowers,
Sparkle such rainbow butterflies;
That they might fancy the rich flowers
That round them in the sun lay sighing,
Had been by magic all set flying."

GENUS XVI.—APATURA.

Fabricius.

APA'TURA, a surname of Venus, which she obtained from a trick she played on some giants.—Strabo. xi. 757.

This is a genus of about some forty species, most of which are remarkable for the splendid blue, or rather purple, gloss on the wings of the male. The greatest number of species are South American, but some are found in Asia and in the Malay Archipelago. Only two occur in Europe, and but one in England. The tropical species rarely surpass our own either in size or beauty, and are often much inferior to it in both respects. One other of the family, *Charaxes jasius*, occurs in the South of Europe. The caterpillar differs from that of *Apatura*, by having four horns on the head instead of two; and the hind-wings of the butterfly are furnished with two rather long tails.

The body and antennæ of *Apatura* are thick, the eyes smooth, and the hind-margin of the fore-wings concave.

APATURA IRIS.

Purple Emperor.

IRIS, Linn. Iris, the Rainbow, personified in Greek Mythology, into the messenger of Juno, a young woman dressed in a robe of many colours, so admirably beautiful that she has been justly called the daughter of Thaomas, a poetical personage, whose name is derived from a Greek word that imports to admire, and what is more admirable than that Bow, which is formed by drops of water in a cloud opposite to the sun.

The male butterfly above has that splendid glow of changing purple, which gives him his name of the Purple Emperor. Both sexes are of a blackish-brown on the upperside, and have a white band commencing at the middle of the fore-wings, and crossing the hind-wings, at the inner margin. There is also a curved row of white spots from the costa of the fore-wing to the anal angle, and three smaller ones near the tip. Both wings have a few paler mottlings, especially at the hind-margin, where they form a narrow irregular band. There is a black eye-like spot in an orange ring near the anal angle of the hind-wings. The underside is varied with different shades of grey, brown, black, and tawny, the white markings the same as on the upperside; near the hinder angle of each wing is a black eye-like spot with a large blue pupil in a tawny ring. The width across the wings varies from two inches in the male, to three and a quarter inches in the female. This species varies

by having the white band more or less suffused and hidden by black scales. When the band is altogether wanting the variety is called *Iole*.

The egg is of great size, its shape cylindrical, of about equal height and diameter, adhesively fixed in an upright position on its flat base, domed on the top, its surface strongly ribbed, the ribs varying in number from twelve to fourteen. When laid it is of a yellowish olive green, having near the base a zone of purplish black, the green portion semi-transparent, the surface glistening. Afterwards the lower portion changes to a paler green, and the upper to a black.—Buckler.

The caterpillar when just hatched has a large rounded head, and two distinctly separated anal points; its colour is a light dirty greenish-yellow, with three faint darker lines down the back, the head of a dark chocolate brown. When full-grown and stretched out, the caterpillar attains the length of two inches, is rounded, and tapering towards both head and tail, the anal segment being prolonged into two points, instead of the usual claspers, and two horn-like processes (not retractile) spring from the crown of the head. It is covered with warts, and is of a pale green colour, with a yellow spiracular line, and oblique yellow lines on the sides. It is totally different from any other caterpillar we have, and its shape is very much like that of the common black slug (*Arion ater*), but not so large. When full-fed, the caterpillar spins a large quantity of silk on the underside of a leaf of willow or poplar, on which it feeds, and then attaches itself to it by the anal pro-legs, and slightly with the anterior pair of ventral ones, and remains motionless for about four days, it then relaxes its hold by the ventral pro-legs and hangs down, suspended only by the anal pair, and within an hour the transformation to a chrysalis is complete.

The chrysalis is of a very pale whitish-green, with whitish oblique lines on the sides, also with nervures on the wing-cases and dorsal ridge. The form of it is broad and flattened on the sides, the outline of the abdomen and wing-cases nearly straight, while that of the back forms a very obtuse angle, having a thin and rather sharp ridge, projecting to a point about half-way, from which it slopes off to the anal point and to the head, which has a short, pointed, flattened, forked pair of appendages.—Buckler's "Larvæ of British Butterflies."

The Purple Emperor is to be found on the wing in July, and the eggs are laid the same month. They hatch in about ten days, and the caterpillars feed slowly until they retire for the winter. They do not conceal themselves, but remain exposed. In May or June they are full-fed, and remain about a month in the chrysalis state. It is found in Central Europe, in France, Italy, and Southern Russia, but does not seem to extend further. It is unknown

in Ireland, Scotland, and the Isle of Man, and its range in England is restricted to the oak woods of the midland, eastern, and southern counties, coming up on the east coast as far as Lincolnshire, and extending as far west as Torrington, in North Devon, and the Forest of Dean, in Monmouthshire. In the counties of Dorsetshire, Wiltshire, Bedfordshire, Berkshire, and Middlesex, none have been seen for a great many years. This beautiful butterfly is said to be only found in oak woods. Why this should be so, when the caterpillar feeds on poplar and willow, has not been explained. It is fond of disporting itself on the tops of the loftiest trees, and the old mode of capturing him was by a ring net, fixed at the end of a pole some twenty or thirty feet long, and so sweeping him off as he sat on his leafy throne, or in one of his evolutions, when he quitted his seat for a turn in the air. As this method of capture proved rather unsuccessful, the length of the implement making it rather an unwieldy one, both in use and for carriage to the place of action; other means have been tried with more or less success, to induce the monarch to descend from his lofty throne. A sod, or something similar flung into the air, has sometimes brought him down, whether from curiosity or indignation at the intrusion. Another plan is to take advantage of his royal taste for game, and so potent is the attraction of the *haut-goût* for the royal palate, that if any animal, or part of one, not too recently slaughtered, be suspended near the well-known haunts of his majesty, ten to one but its savour will bring him down to earth to taste the luxurious morsel, and so engrossed does he become, that he may be swept off with the net without difficulty. Cowardice is not one of his attributes, and if he has formed a preference for any special spot, he will risk loss of liberty and life rather than forsake it.

The first account we have of the Purple Emperor being a British species is in John Ray's "*Historia Insectorum*," published in 1710. He informs us that it was taken in the month of July, in the neighbourhood of Heveningham Castle, Essex, in the year 1695, by D. Courtman.

In his "*English Moths and Butterflies*," published in 1773, Benjamin Wilkes writes, "The Purple Emperor, or Emperor of the Woods. Neither the caterpillar nor chrysalis of this charming fly has yet been discovered, although sought for with the utmost diligence several years past. The butterfly appears at the end of June and beginning of July, and may be taken in Coomb Wood in Surrey, about Westram in Kent, and in other places. It flies like a hawk, delighting to soar aloft and skim in the air. When it settles it is usually on some extreme part of the oak, hazel, or ash tree; and what is very singular, I myself have seen twenty of them taken on the same branch, one after another, for although the fly seems to be extremely wild

whilst on the wing, yet, when settled, you may lay your net over it with little trouble."

Moses Harris, in his "Aurelian," published in 1775, writes "On the 26th of May, in the year 1758, Mr. Drury, an ingenious Aurelian, in searching for caterpillars, beat four off the sallow near Brentwood, in Essex; which in their shape and motion differed from any hitherto discovered, being furnished with two horns, of the same hard substance as their heads, resembling the telescopes of a snail, and in their progressive motion seeming rather to glide along like that animal, than crawl as most caterpillars do. Struck with the oddity of their appearance, and knowing I was about a work of this kind, he was so obliging to give me one of them, which I fed on sallow, and found, that excepting the above-mentioned particularities, it greatly resembled the hawk tribe, having a point or horn in its tail, its body being green, beautifully frosted with minute yellow specks, having likewise seven diagonal lines of a pale yellow on its sides, and when at rest generally sitting in the posture these caterpillars do. On the sixth of June, at night, it changed into a chrysalis of a beautiful pea green, with a bloom of pearl colour on it, and what is more remarkable, the diagonal lines, which crossed the sides of the caterpillar, are seen in this state, though the colour is fainter. This being the chrysalis of one of the finest flies in this part of the world, Providence seems to have taken peculiar care for its preservation in this defenceless and tender state, by making its colour so like the leaf it hangs on to, that it might escape the search of a very nice eye. In examining that part of the chrysalis which contains the wings of the fly, I was confirmed in my opinion of its being the Purple Emperor, by observing that the square points of the under wings projected beyond the rounded extremity of the upper ones; this conformation of the under wing being peculiar to that fly. On the 22nd, at night, a few dark spots were visible on the wings, and the next day I found more on different parts of the body, which spread gradually till the whole fly appeared black through the transparent chrysalis, and about eight in the evening, to my unspeakable pleasure, it produced the male Purple Emperor. Here I hope I may be indulged in expressing my gratitude to my generous and worthy friend Mr. Drury, for the discovery of the caterpillar of one of the most beautiful flies in the Universe, and which had hitherto eluded the search of the most skilful and industrious Aurelians. The colour of this fly is changeable, according to the different lights it is viewed in. For in one it appears of a sooty black, and in another the eye is suddenly dazzled with a resplendent glow of fine purple; so that by frequently turning the fly into different positions, the colours play and shift through all the gradations, from a sooty black to a bright purple, in such a

manner as to entertain the eye with a delightful and amazing variety. The female differs little from the male; being of a sooty black, but without the least tint of purple. Mr. Nixon took a female, which laid five eggs on the 21st July, three of which produced caterpillars the 6th of August. This gentleman endeavoured to raise them, and tried them with several sorts of growths, but the sallow being omitted, they all perished. From this we may be certain, that they are in the caterpillar state during the winter. It is a very difficult matter to catch them in their flight, for they generally hover like a kite about very high oak and ash trees; and though when they remove from one high tree to another, they skim lower than at other times, they do it with such rapidity, that the eye can scarce follow them. They delight to settle on the oak and ash, creeping from one leaf to another to sip the dew, at which time they may be easily caught. For this purpose you must be provided with a pole fifteen feet long, with a net at its upper end, the mouth of which, when you have covered the fly, is drawn together by a string, as a purse is. These flies are found in the greatest plenty at Coomb Wood, near Kingston-upon-Thames."

In the first volume of his "Natural History of British Insects," published in 1792, Donovan writes, "The *Papilio iris* is esteemed among the beautiful, and placed with the rare, of the English Lepidoptera. It derives the title of Purple High-flyer, as it very rarely descends to the ground; except in some few instances, and even those instances have been after a strong wind or heavy rain. The tops of the loftiest forest trees afford it an asylum, and in the caterpillar and chrysalis state, it is preserved from the wanton cruelty of man, by the almost inaccessible height of its habitation. They feed on the sallow (*Salix caprea*), and the caterpillars are obtained by beating the branches of the tree with a pole twenty or thirty feet in length; it is then, but a necessary precaution to cover the ground beneath with large sheets to a certain distance, or the insects which fall, will be lost amongst the herbage. The great difficulty and trouble to rear the caterpillars when found, and greater difficulty to take the fly, has stamped a valuable consideration on it, and particularly so when fine, and a high price is but esteemed an adequate compensation for it, if in good preservation."

Haworth, in his "Lepidoptera Britannica," 1803, gives a very interesting account. "This Purple Emperor of the British oaks is not undeservedly the greatest favourite of our English Aurelians. In his manner likewise, as well as in the varying lustre of his purple plumes, he possesses the strongest claims to their particular attention. In the month of July he makes his appearance in the winged state, and invariably fixes his throne upon the summit of a lofty oak, from the utmost sprigs of which, on sunny days, he per-

form his aerial excursions ; and in these, ascends to a much greater elevation than any other insect I have ever seen, sometimes mounting higher than the eye can follow, especially if he happens to quarrel with another Emperor, the monarch of some neighbouring oak : they never meet without a battle, flying upwards all the while, and combating with each other as much as possible ; after which they will frequently return again to the identical sprigs from whence they ascended. The wings of this fine species are of a stronger texture than those of any other in Britain, and more calculated for that gay and powerful flight which is so much admired by entomologists. The Purple Emperor commences his aerial movements from ten to twelve o'clock in the morning, but does not perform his loftiest flights till noon, decreasing them after this hour, until he quite ceases to fly, about four in the afternoon : thus emulating the motions of that source of all his strength—the sun. The females, like those of many other species, are very rarely seen on the wing : the reason of which is both interesting and but little known. It is their being destitute of a certain spiral socket, which the males possess near the base of the main tendon of their upper wings ; which socket receives and works a strong elastic spring, arising from the base of the underwings, thereby enabling them to perform a stronger, longer, and more easy flight than it is possible for the females to do. Moses Harris, I believe, was the first who discovered and published figures of this socket and spring, in an ingenious but little known work, called “An Essay preceding a Supplement to the “Aurelian,” wherein he tells us ‘the females are not met with on the wing so often as the males, some of which are very plentiful, but the females rare to be seen, of which the Purple Emperor is one capital instance. I have been informed Mr. Whitworth caught thirteen in one day, and but one female amongst them.’ Harris, in the above essay, has divided the genus *Papilio* ingeniously enough into sections or families, from the number and position of the tendons in the wings, in a manner somewhat like that of my friend Jones in the first volume of Linn. Transactions. In the same volume is a further and fuller account of the socket and spring, by Esprit Giorna, of Turin.

In the first volume of the “Entomologist,” published in 1842, Mr. Hewitson writes, “During the months of June and July, 1839, which, though at home very wet and unfavourable to Entomology, were on the Continent dry, hot, and sunny ; I spent most of my time in the forests, which border the town of Kissingen in Bavaria, and had an excellent opportunity of observing the habits of the butterflies, with which the woods abound. Amongst them none were more conspicuous, and few more abundant than the Purple Emperor. At the end of a long and very rapid flight, at the outskirts of the wood, the

Emperors would enter its more shaded recesses, and settling wherever moisture was to be met with, would protrude into it their long trunks, and were soon heedless of my approach. I found a flat bagless net by far the best when their wings were thus expanded, allowing them no room for motion. Instead of employing their sunny hours in sipping sweets, and

"Gathering honey all the day
From every opening flower,"

their delight was to extract the juices of each swamp-hole, and the filthier the puddle the more it seemed adapted to their taste. Seating myself near one of these, I selected the finest specimens as they settled down, and watched them till they closed their wings; so intent were they on their occupation that they would usually permit me to take them between my finger and thumb. They were so numerous that I had no less than seven under a small net at one time, and even showed but little anxiety to get away. Amongst them were several with more of red than purple on their upper-wings, but I believe these were only varieties. I was surprised to meet with so few butterflies that were not well-known friends; ten species only. The White Admiral, so justly noted for its graceful flight, was there in great beauty and abundance; the Queen of Spain and Arion Blue were not uncommon. Upon a grassy bank of very limited extent in the centre of the forests, I saw thirty fine species of our British butterflies. I again spent the same months of 1841 at Kissingen, and was sadly disappointed, when the weather would permit me to visit my former haunts, to find them deserted by most of the more brilliant butterflies; indeed, so wet was the season, that the Purple Emperor, the White Admiral, and many others never appeared at all."

In the second volume of the "Entomologists' Weekly Intelligencer," Mr. Sturgess writes thus, "You may judge how agreeably surprised I was to learn, one scorching day in July, that the Purple Emperor had been caught regaling himself upon the imperial delicacies of dead stoats, weasels, &c., laying upon some low bushes. I had the satisfaction of seeing within the space of an hour three Emperors descend from their thrones to breakfast upon the delicious viands." A few pages further on in the same journal Mr. Sturgess again reports progress thus: "On the 11th July three specimens, on the 13th, six; on the 14th, seventeen; on the 15th, twenty; on the 16th, eight; on the 17th, six; on the 18th, fourteen; on the 23rd, three; and on the 24th, three; thus making a total of eighty specimens in nine days. The experiment was not tried in the same place as last year, but in a wood of some thirteen acres, where the Emperor appeared to be more plentiful: the keeper kindly consented to nail a portion of rabbit skin and wing of a bird to the end of a house, a similar bait was also placed on a lime heap about a dozen

yards distant. Here, Mr. Newman observers in his "British Butterflies," is sufficient evidence of the kind of delicacies best adapted to the imperial palate; an adaption which, however, I may regret, I am unable to dispute. I would gladly have depicted the Emperor of our insect world as banqueting on ambrosia, an esculent of which, by the way, I have no clearly defined idea, or quaffing the nectar of flowers, but this would not be truthful: in this, and other cases of depraved appetite, we can only lament a fact as incontrovertible as it is unsatisfactory, repeating the somewhat trite, but once sapient axiom, *de gustibus not est disputandum*. I am able, however, to assign his imperial majesty one instance of more refined taste—Dr. Knaggs records in the fourth volume of the "Entomologists' Weekly Intelligencer," that he succeeded in decoying an Emperor by painting the trunk of a tree with sugar, and thus secured him."

In the "Zoologist," for the year 1852, the Rev. W. Bree writes, "Early in the morning, and on dark, gloomy days, I have several times seen to the greatest advantage, the most splendid of all our butterflies at Barnwell and Ashton Wolds, sailing along the ridings, and settling upon the ruts and other moist and shady spots, often assailed by the impudent attack of *Janira* and *Galathea*, which appear to be the foremost in attacking him, when he thus condescends for a while to leave his lofty oak to visit the regions inhabited by his less honourable kindred. The partiality which this insect exhibits for individual sprigs of particular trees has often been remarked upon by entomologists, and is certainly confirmed by the Emperor of this neighbourhood. And it should seem as if this partiality were, if I may use the expression, hereditary; for upon a certain sprig of a small ash tree, by the side of one of the ridings in Barwell Wold, Northamptonshire, I have each year since 1847 succeeded in capturing the Purple Emperor; and in all instances, upon the capture of one, the identical sprig has in the course of a few days been invariably occupied by another Emperor."

In the "Entomologist" for 1882, Mr. Anderson, writing from Chichester, records a singular habit of this butterfly, thus: "It seems to be the invariable habit of *Apatura iris*, upon first emerging from the chrysalis, to cling to the empty case with the head uppermost for five or six hours, and then to reverse the position, and still clinging to the case remain with head down and wings upwards for a similar time. For the first attitude it is easy to account, for the wings could not well be developed in any other way, but why the insect should turn round and continue so long in the second position I cannot understand."

The Purple Emperor does not seem to be the only one of the genus which has a fondness for puddles, for Mr. Goss, in the "Entomologist" for 1880,

records *Apatura agathina*, Craner, sent from Coerientes, and also from Paraguay, in South America, as being accredited with a proclivity for stagnant puddles and wet mud, like its imperial relative here in England.

In the same volume, *Apatura iris* is reputed as being less rare than usual in the New Forest, and also in Sussex, the var. *Iole* being amongst the number taken.

In the "Entomologist" for 1881, Mr. Sabine writes, "I have taken this season, numerous specimens of *Apatura iris* in our county of Kent. Amongst them is a large and beautiful example of the black variety *Iola*. I captured another on the same ground four years ago."

It was figured by Petiner in 1702, under the name of *Oculatus* or Mr. Dale's Purple eye.

Perhaps I cannot conclude this prolonged account of the most noble of our British butterflies, better than by quoting some of the verses written on Sir Joseph Banks, President of the Royal Society. Peter Pindar, the ingenious author of the poem, introduces Sir Joseph Banks as in pursuit of of butterflies in the following manner:—

SIR JOSEPH BANKS AND THE EMPEROR OF MOROCCO.

A President, in butterflies profound,
Of whom all Insectmongers sing the praises,
Went on a day to catch the game renown'd,
On violets, dunghills, nettletops, and daisies.

But first (so pious is Sir Joseph's nature),
He thus address'd the butterfly's Creator:

"O Thou, whose wisdom plann'd the skies,
And formed the wings of butterflies,
Attend my humble prayer!"

* * * *

In rush'd Sir Joseph at the garden door,
Knock'd down the gard'ner, what could man do more,
And not content with feats like these,
He stumbl'd o'er a hive of bees,
Out came the swarm, wondering what
Had brought destruction to their very doors.

* * * *

"He's gone! he's gone!" Sir Joseph cried,
"Whose gone?" the gard'ner enquired,
"The Emperor, I see him no more!"

Family NYMPHALIDÆ.

Their wings with azure, green, and purple gloss'd,
Studded with colour'd, with gems embossed,
Inlaid with pearl, and marked with various stains
Of lively crimson through their dusky veins.

MRS. BARBAULD.

GENUS XVII.—LIMENITIS.

Fabricius.

LIMENITIS, a Greek word signifying harbour keeping, an epithet applied to several divinities, but especially to Diana.

A genus of about thirty species, some of which are of considerable size. They are natives of Europe, Asia, the Indian Islands, and North America. Three only occur in Europe, and but one in Britain.

Limenitis somewhat resembles *Apatura* in appearance, but may be discriminated by the rotundity of the hinder margin of the fore-wings, and pubescence of the eyes and palpi; the club of the antennæ is more slender than in *Apatura*, and not arcuate and sub-compressed, as in *Hipparchia*; and the males are without that beautiful purple gloss so characteristic of those of *Aptura*. The caterpillars are totally different, being elongate, with obtuse spines on the back, and bundles of hair on the sides. The chrysalids are sub-angular, with beaked head cases.

LIMENITIS SIBYLLA.

White Admiral.

SIBYLLA, Fab. Sibylla, one of the Sibylls, divinely inspired women, who composed the Sibylline verses, offered to Tarquin the Proud, King of Rome.

This elegant butterfly is one of those in which the choicest ornamentation is bestowed upon the under surface. Above a dark black brown tint, banded and spotted with white, is all that meets the eye; but beneath there is a piece of the most exquisitely harmonious colouring, though the hues that compose it are still of a subdued and secondary nature—silvery blue, and golden brown blended with a lighter brown and black, are placed in vavacious contrast with bands and spots of pure silvery white.

The width across the wings varies from two inches in the male to two and a half inches in the female.

This species has no named varieties, and is tolerably constant to the type, except that the central band, like that of the variety *Iole* of *Aptura iris*, is more or less broken by the darker ground colour. A figure of this variety, by the Rev. W. Bree, is in the fifth volume of "Loudon's Natural History."

Mr. Bree observes, "The peculiarity consists in the wings above being entirely of a sooty black; and, consequently, destitute of the white markings, and the elegant white band, which form so striking a character in the ordinary specimens of *Sibylla*. A few lighter spots, however, are visible here and there, both on the anterior and posterior wings; just serving to trace out, very faintly and obscurely, the mere rudiments, as it were, of the usual white marks and fascia. The cilia are white, as in other specimens. On the under surface of the wings the white fascia is also wanting, and the spots and markings are far less numerous and distinct than usual. The colouring, likewise, is less brilliant, the tints being blended together and softened into each other, in a way which it is not very easy to describe in words.

In Mr. Bond's cabinet is a variety in which not a trace of the usual markings is to be found on the upperside, an uniform sooty black being diffused over the whole surface. The underside is equally abnormal.

The egg is something the shape of an orange, only flatter at the poles, and has been compared to those sea-urchins or sea-hedgehogs which are found on the sea beach, and are to be seen in the window of every shell shop.

The caterpillar is of a pale delicate green, with numerous white dots, and branched purplish red spines, two on each segment, except the second and thirteenth; on the third, fourth, sixth, eleventh, and twelfth segments these spines are long: on the fifth, seventh, eighth, ninth, and tenth they are short; there are also four very short spines or bundles of hair on the thirteenth. The colour of the caterpillar becomes lighter as it approaches the spiracles, which are white encircled with black, and are placed just above a white spiracular line, in which, beneath each spiracle, is a bright yellow blotch; above the spiracles is a broad purple stripe; the head is pink, marked with brown, covered with white dots, and surrounded with spines; the legs are of an obscure brownish green, with claspers of a paler shade, and pink tips.—Wilson's "Larvæ of British Lepidoptera."

The chrysalis is very angular, and its wing cases very projecting, the dorsal surface of the thorax rises to a prominent ridge, and a little beyond it is a flat, round, and very projecting process on the back, and from thence to the anal tip the abdomen is slightly sinuous, and therefore hangs a little on one side; two flat-forked processes project from the head. Its colour at first is a greenish white, but it gradually darkens, and in a few days the thorax and wing-cases are deep olive green, the centre of the back of the abdomen bright apple green, its tip and underside being dark brown, which forms on the back a broad band, including the flat circular prominence at its termination. The hare's ear-like projections at the head are also dark brown, the nervures of the wings can be seen distinctly; the portions that appeared

at first quite white have now been transmuted into metallic adornments; a brilliant golden streak divides the brown colour from the green of the wings, commencing on each side of the back of the thorax, and a golden spot is seen on each side of the tip of the tail, these silvery spots decorate the underside of the abdomen, and its prominences are embellished with similar spots and streaks both above and beneath.—“Buckler’s Larvæ.”

The butterfly emerges from the chrysalis at the end of June, and continues on the wing during July. Mr. Newman, in his “British Butterflies,” observes: “In July the female is seen hovering over the thickest parts of our tallest copses, wherever the stems of the honeysuckle are imbedded, like petrified snakes, in the upright stems of the hazels, and the foliage of that sweet climber which has surmounted the hazel spray, and whose blossoms are gaping wide in the sunshine diffusing their delicious fragrance through the summer breezes. The actions and movements of a female butterfly when engaged in the maternal duty of oviposition, are very different from her ordinary gait when sailing over the opening blossoms of the bramble in company with friends, lovers, and kinsfolk. It is evident to the eye of the naturalist that she is now on weighty affairs of business; there is no time lost, none of those flirtations and love-chases so much admired and so glowingly described by our predecessors in the study of entomology. Her flight is slow, flagging, flapping, and only from leaf to leaf. She selects with unerring discrimination the leaves of the honeysuckle, even when surrounded and apparently half-smothered, with the foliage of the hazel, and lays a single egg on the upper surface of a leaf; she then flutters off to another, then to another, never tiring, never hesitating which leaf to choose, but always directed by an unfailing instinct to the honeysuckle, and always avoids those leaves on which an egg has been deposited.”

“The little caterpillar comes out of the egg in about fourteen days after it is laid, and toddles to the very tip of the leaf before it begins eating, and then it nibbles away day after day, eating the green part, and leaving only the mid rib sticking out like a bristle, and always after a good meal of leaf it goes to the very point of this bristle, and there rests while its meal digests and while it acquires strength for future attack on the same leaf. Day after day the alternate processes of eating the leaf and resting on the tip of the bristle-like mid rib continue, until three-quarters or more of the leaf has been eaten, and then it knows that its devouring duties for the year are over. We all know that the leaves of the honeysuckle are deciduous, and in the course of nature would fall off before winter; this, however, would not suit the requirements of the juvenile caterpillar, which, having once fallen to the ground with the fallen leaf, would inevitably perish. To prevent this falling is

absolutely necessary to the existence of the caterpillar, and therefore to the preservation of the species; how then is this to be accomplished? The caterpillar, by spinning a number of silken threads wound round and round the twig, and round and round the leaf stalk, fastens the leaf stalk to the twig to which it is still attached. The next process is to make a winter habitation of that portion of leaf that still remains uneaten, the corners of this uneaten portion are fastened tightly together, and then the edges are united, these operations being effected by means of silk spun from the mouth; the work is then finished, and the little caterpillar is laid up for winter quarters inside his hammock, the bristle-like mid rib of the leaf curling over it like a tail. Now the process of fastening the leaf to the twig by silken cables has done nothing to prevent the natural dehiscence of the leaf stalk at its base, so that this inevitable process takes place at the appointed time, and then the little cot, instead of standing erect falls as far as the cables will permit, always less than half-an-inch, and rocks to and fro all the winter, lulling the infant caterpillar to sleep, and keeping him asleep for six consecutive months; rain, snow, ice, wind, and all the vicissitudes of our winter, have no power to injure or even to awaken him; hung aloft in his little cradle he rocks in comfort and security, and rides out the roughest storm without a thought of harm. In April he wakes up. The same increase of temperature which poets tell us rouses 'the torpid sap detruded to the roots'—a very apocryphal doctrine, by the way, as the change of temperature is more likely to be felt in the air than on the earth: however, the same change of temperature which compels the leaf buds to burst, also resuscitates the little caterpillar; he wakes up, crawls out of his hammock, but goes no further than to the upper side of the twig immediately above the aperture he has just quitted." At this time he is about three lines long. His first proceeding, Mr Buckler tells us, is to cast off his winter's coat, and accordingly he attaches himself to a spinning of silk on a twig, and by degrees crawls out of his old skin, which is left adhering to the silk, not shrivelled up, but looking still much like a caterpillar. He now no longer confines himself to the tip of the leaf, but feeds away, with all the voracity which a winter's fast may be supposed to have engendered, during nearly the whole of April and May, and by the beginning of June is full fed. When full fed he spins a silken web over the under surface of a leaf of the honeysuckle, thickened into the form of a pad on the mid rib, and attaching himself to this by the anal claspers, suspends himself in a curved position waiting for the change to a chrysalis. He remains motionless for three days, rapidly becoming paler. In the course of the third day the creature seems to wake up, unbends his head, swings himself to and fro a few times, then stretches himself downwards in a

long and attenuated line, which causes a rupture of the skin close to the head; the skin then is seen slowly to ascend, exposing the bare and soft shining parts below, from which a flat and forked pair of horns grow out perceptibly as one beholds this wonderful process; the skin continues to glide slowly upwards; and as the soft parts become exposed they are seen to swell out laterally, and assume the very singular projections of the chrysalis, the skin of the old head, gliding up the body, marks the progress of the disclosure, as the colour of the old and new surfaces are at this time alike, but the new is rather more shining and semi-transparent; occasionally, during the bulging out of the soft parts, a kind of convulsive heave or two occurs, but otherwise it remains still, until the creature is uncovered as far as the ninth or tenth segment; it then curves its anal extremity by a sudden twist laterally, and in a moment dexterously withdraws the tip of the anal segment from the claspers by an opening on the back of the skin at that part. At this critical moment one has time to see that the naked, shining point, is furnished with black hooks, and to expect its fall, but in another moment it has forcibly pressed the curved tip with its hooks against the stem, close to its previous attachment of the anal claspers, which have proved strong enough for the occasion. The creature now seems endowed with wonderful power and vigour; it swings boldly to and fro, and undulates itself as if to gain longer swings, when presently the old skin that remains is seen to burst away and fall off, the chrysalis gradually becoming quiescent. The entire metamorphosis, from the first waking to the last movement, occupies nearly seven minutes.

The White Admiral occurs throughout Central Europe, and is also found in Northern Asia, but as it frequents woods is always local. It is unknown in Ireland, Scotland, and the Isle of Man, and its range is restricted to the woods of the Eastern and Southern counties, coming up on the east coast as far as Lincolnshire, but is not found west of Dorsetshire, and scarcely extends to the Midlands. It is distinguished for its exceedingly graceful flight, which is only excelled by that of the Purple Emperor.

The first account we have of the White Admiral, being a British species, is in John Ray's "*Historia Insectorum*," published in 1710. He informs us that it was taken in Essex, not far from the town of Tolesbury, by D. Morton, and sent to him on July 11th, 1695.

In Petiver's "*Papilionum Brittanniæ Icones*," 1695, we read "White Admiral. Found about Dullidge and Wickham, near Croyden, as also at Henly-upon-Thames."

Wilkes, in his "*Aurelian*," informs us "That the White Admirable Butterfly is to be taken about the 20th of June, in Coomb Wood."

Lewin, in his "British Insects," 1795, writes "This insect appears on the wing about the 24th of June, and is not uncommon. It frequents the south sides of woods and lanes near them; and may be readily taken as it is feeding on the various flowers then in bloom, before nine o'clock in the morning, after which time, as the sun grows hot, it sports and flies about with great swiftness, frequently settling on the tops and sides of high trees. It is very extraordinary, that, though this fly is an inhabitant of almost every patch of wood in England, neither the greatest pains taken, nor accident, have yet discovered the caterpillar. A friend of mine once found two chrysalides, suspended by the tail on different parts of a low honeysuckle bush, in a retired part of a wood; both of which produced fine specimens of this butterfly the latter end of June. The chrysalis, as he described it, was hog-backed, with the resemblance of two rows of knobs on the back, and of a reddish brown colour."

Donovan, in his "Natural History," vol. 8., published in 1799, writes "The White Admirable Butterfly feeds upon the honeysuckle, and is found in the months of June and July, in the skirts of woods; its habits is much the same as that of the Red Admirable, but it is by no means common. This has hitherto been deemed the *Papilio Camilla* of Linnæus, though it differs in a slight degree from the descriptions and figures of authors who describe only German or Swedish specimen of it. In the late editions of the *Systema Naturæ*. *Camilla* is described with *Sibylla*, a *Papilio* nearly allied to it, but which Linnæus considered as a distinct species; his description of *Camilla* expressly saying 'angulis ani rubro.' The angulis ani of *Sibylla* not being of a real colour, removes it from the English species. Fabricius is of a different opinion. We consider the English Admirable as the true *Camilla*, and that *Sibylla* not *Camilla* is the Austrian species; it is much darker on the upper surface, and has a row of shining blue spots all round the wings: the base of the posterior wings, beneath silvery and without spots, as Fabricius describes his *Camilla*. Our insect on the contrary has a row of blue spots on the upper surface, but a red spot at the inner angle of posterior wings; the base of the lower wings are also silvery beneath, but has black spots upon it. They differ in many other respects: these alone determine them to be two species, and ours to be the *Camilla* of Linnæus. We have inspected the drawings of Mr. Jones, from which Fabricius describes most of his *Papiliones*, and are confirmed in our opinion."

In his "Lepidoptera Britannica," published in 1803, Harworth writes, "The graceful elegance displayed by this charming species when sailing on the wing, is greater perhaps than can be found in any other we have in Britain. There was an old Aurelian of London, so highly delighted at the

inimitable flight of *Camillia*, that long after he was unable to pursue her, he used to go to the woods, and sit down on a stile, for the sole purpose of feasting his eyes with her fascinating evolutions."

Mr. Haworth goes on to say "The following admirable lines of Pope, Virgil, and Dryden, although not all of them exactly necessary, to elucidate this subject, I cannot refrain from transcribing in this place":—

"These equal syllables alone require,
Tho' oft the ear the open vowels tire,
While expletives their feeble aid do join,
And ten low words oft creep in one dull line,
Soft is the strain when zephyr gently blows,
And the smooth stream in smoother numbers flows ;
But when loud billows lash the sounding shore,
The hoarse rough verse should like the torrent roar ;
When Ajax strives some rock's vast weight to throw,
The line too labours, and the words move slow ;
Not so when swift Camilla scours the plain,
Flies o'er the unbending corn, and skims along main."

POPE.

"Vel mare per medium fluctu suspensa tument,
Ferret iter, celeres nec tingeret æquare plantas."

VIRGIL.

"She swept the seas, and, as she skimm'd along,
Her flying feet unbathed on billows hung."

DRYDEN.

"In its beautiful flight," observes the Rev. Revett Sheppard, M.A. (of Wrabness, in Essex, a most intelligent and scientific naturalist, in Miss Jermyn's "Butterfly Collectors' Vade Mecum," second edition, published in 1837), "when it skims aloft it rivals the Purple Emperor, which it strongly resembles in appearance. It seems, however, unlike the latter, to avoid the sunbeams, for it frequents the glades of woods, where it rapidly insinuates itself by the most beautiful evolutions and placid flight through the tall underwood on each side the glades, appearing and disappearing like so many little fairies."

Mr. Newman, in his "British Butterflies," 1871, observes that we are indebted to Mr. Hunter for the first description of the caterpillar and chrysalis of the White Admiral from English specimens; it was published in the "Zoologist," for 1851. The descriptions by Curtis and other British authors, copied from Hubner, refer to another species (*Camilla*) not yet found in Britain; the error originated in the fact that Haworth applied the name *Camilla* by mistake to our English insect. A second and much more detailed description of the caterpillar, by M. de la Chaumette, is published in the same volume, and a description of the caterpillar of *Camilla* is given to show

the difference between the two species ; but both descriptions are from Swiss specimens.

Limenitis camilla is, in Switzerland, by far the commoner species of the two, and generally frequents gardens ; whilst *L. sibylla* confines itself to open places in woods and forests.

GENUS XVIII.—VANESSA.

Fabricius.

VANESSA, probably from Swift's poem "Cademus and Vanessa," in which the Dean (Decanus) tells the story of his love for Esther (Essa) Vanhombrugh. Sodoffsky proposes Phanessa, from Phanees, a Neo-platonic name for the God of Love.

This genus contains the most vigorous and active of the British butterflies, which are no less distinguished by their boldness than by their superior size, and by the gaiety of their colour. Indeed one species, *Antiopa*, with its rich chocolate coloured wings, bordered with white or yellow, offers a character almost unique in the Diurnal Lepidoptera ; and the same may almost be said of *Io*, which, its richly coloured wings, so aptly described by the poet Spenser—

"The velvet nap which on his wings doth lie,
The silken down with which his backe is dight,
His broad outstretched horns, his hayris thies,
His glorious colours and his glistening eies,"

renders one of the most beautiful butterflies of the northern zone. Not far behind, again, is *Atalanta*, in her scarlet robes of aldermanic dignity. It also contains that singularly shaped species *C-album*, which the rugged and jagged appearance of its wings sufficiently distinguishes from every other British species : indeed wings indentated in this remarkable manner are rarely seen in any insects, those from foreign countries not excepted.

Their geographical range is extensive, and the species of the Old World are, to a certain extent, represented in the New World ; and three species *Cardui*, *Atalanta*, and *Antiopa* seem to be common to both hemispheres. *Antiopa*, generally so rare in Britain, though it has sometimes appeared in numbers is common almost throughout Europe, and, in America extends from Hudson's Bay to the Rocky Mountains ; and southwards to the mountains of Mexico. *Cardui* has, perhaps, a wider geographical range than any other butterfly, being found throughout the whole of Europe, Asia, and Africa ; and in the New World has been met with from Hudson's Bay to within ten or twelve degrees north of the Equator. It is also found in the

Polynesian Islands, Australia, and New Zealand, and apparently all over the world, except in South America.

All the species hibernate, some in a dark corner of a house, others in hollow trees, and imagines of *Urticæ* have been found in the crevices of chalk, nearly a foot below the surface. It is curious to observe some of those which appear in September, at once hiding themselves, and remaining motionless until the spring, when they appear as perfect as though they had just emerged from the chrysalis. Others fly much in the autumn, and then reappear in the spring, worn and ragged. Most of them are very common; and as they are generally double-brooded, and the second brood passes the winter in the perfect state, they may be found almost, if not entirely, throughout the year. They are found in gardens, fields, and woods, and are very fond of sucking the honey from thistles and other tall flowers, and also from ivy blossoms. They may also be observed sucking the sap oozing from the trunks of trees, or on fruit; *Atalanta* specially being fond of an over ripe plum.

The species of this genus may be distinguished generally from the rest of the family by having the eyes pubescent and the wings angulated, by which latter character, as well as by the more sudden formation of the club, they are separated from the terminal genera of the family. The antennæ are rather long, and terminated by an abruptly formed, short, somewhat cylindrical club. The body is very robust, and well formed for sustaining the powerful flight of these butterflies.

The caterpillars are long, cylindrical, and covered with numerous bristly spines, arranged in whorls round the body, each segment, except that immediately following the head, having a whorl of these spines. They feed principally on plants of the natural order *Urticaceæ* as formerly constituted, containing the stinging nettles, hop, elms, &c.

The chrysalis is considerably angulated, with the head bi-tuberculated, and is adorned with silvery and golden hues, hence the name *Aurelia* formerly used for chrysalis, and *Aurelians* for entomologists.

The insects of the present genus may be regarded as the pre-eminent type of that great division of butterflies in which the chrysalis is simply suspended by the tail, and not girt round the middle of the body by a slender skein of silken thread, the forelegs also of the perfect insects being imperfect and unfitted for walking.

Vanessa has been divided into three sub-genera, namely, *Pyrameis* containing *Cardui* and *Atalanta*; *Vanessa* containing *Antiopa*, *Io*, *Polychloros*, and *Urticæ*; and *Grapta* containing *C-album*.

SUB-GENUS.—PYRAMEIS.

Hubner.

PYRAMEIS differs from *Vanessa*, in having the wings less angular, the palpi less hairy and of somewhat different form, and in the club of the antennæ being rather more pointed. The caterpillars differ in a striking manner in their habits, those of *Pyrameis* being solitary, and often, as in *Atalanta*, concealing themselves by drawing the edges of a leaf together. On the other hand those of *Vanessa* are gregarious, the eggs being laid in batches, and the whole of the caterpillars from one batch remaining together throughout their existence as such.

This sub-genus numbers only about a dozen species, divisible into two sections of half-a-dozen species each. One of these sections containing *Atalanta*, Professor Rennie formed into a genus, giving it the name of *Ammiralis*. Mr. Doubleday, in "Doubleday and Westwood's Diurnal Lepidoptera" writes, "I have dwelt particularly on the geographical distribution of this genus, so poor in species, yet so universally distributed, presenting two distinct sections, species of which are known to co-exist in almost every part of the world except the southern parts of Africa and America, never, except in Australia, presenting more than two species in the same district, and those generally of different sections. Thus *Cardui* has for its compatriot in Europe and North America, *Atalanta*; further south, in the Old World, *Callirhoe*; in Java, *Dejeanii*; in Australia, *Itea*, and an undescribed species; in New Zealand, *Itea* and the beautiful *Gonerilla*; in the Sandwich Islands, *Tammeamea*. At the Cape of Good Hope and Sierra Leone it seems to be the only species of the genus. As it dies out, if I may use the expression, in the equatorial and southern parts of America, it is replaced first by one species, then by another, and if these species co-exist, one is sure to be rare, for the co-existence is only found on the very limits of their respective territories."

VANESSA CARDUI.

Painted Lady.

CARDUI, Linn. Car'dui, named from the thistle *Carduus*, on which the caterpillars feed.

This is a highly elegant butterfly, well named, in France "la Belle Dame."

The colouring of the upper surface is composed of black and very dark brown, with irregular markings of an orange red, tinged partially with a rosy hue, those on the right fore-wings bear a tolerably good resemblance to a map of England and Ireland, so writes Professor Westwood in "Humphrey and

Westwood's British Butterflies." Near the tip of the fore-wings are some pure white spots, and the hind-wings have a row of blue-centred black spots. On the underside the hind-wings are beautifully mottled with pale olive-brown, yellowish-buff, and white, the veins being white; near the hind-margin is a row of slender blackish-blue marks, above which are four eye-like spots, the two middle ones being smaller than the outer ones, which are circled with black.

The width across the wings varies from two to three inches.

Varieties are rare. A very beautiful one in Mr. Vaughan's cabinet is figured in Mosley's "Illustrations of varieties of British Lepidoptera." A similar one from Mr. Ingall's collection is figured in Newman's "British Butterflies." Another in Mr. Steven's collection is figured in the "Entomologist," Vol. 6. In these, the black is confined to the costa and tip of the fore-wing, and a row of paler rings appear on the hind-margin of the hind-wings. A variety without the apical spots was in the collection of the late Mr. Alfred Owen. A remarkable variety is figured in the "Entomologist," Vol. 13. In this specimen, the whole of the hind-margin of the fore-wings is suffused with dark umber, almost black, in which the usual row of small white circular spots near the apex, and the two white costal spots are replaced by white fusiform blotches, and two white spots near the anal angle; the two large dark spots, which are usually on the disk, are wanting altogether. The hind-wings are dark umber towards the base, and rust coloured, while between each of the nervures, which are broad streaks of black, are large white spots, forming a row parallel to the hind-margin. The markings are perfectly symmetrical on all the wings. It was bred on September 3rd, 1879, from a caterpillar taken in Clapton Park. Pale and dwarf specimens often occur, and a variety, in which the spots are confluent, has been named *Elymi*; an Australian variety is also named *Kershawii*.

The egg is stout, and barrel shaped, with sixteen sharp edged longitudinal ribs coming over the edge of the top, in the centre of which is a large circular plain spot; the transverse reticulation crosses the ribs and knobs them; the colour of the shell is dark green, the ribs are pellucid.—(Rev. J. Hellins.)

The caterpillar varies from dark grey to black, young individuals being generally the darkest. The spines are paler, but the tips and branches are black. There are a number of warty spots of greyish-yellow, and scattered hairs all over it. The head is black and the legs and claspers generally a dull red. It feeds solitarily beneath a silken tissue on various kinds of thistles, and also on the nettle, millfoil, mallow, and artichoke. The Rev. J. Hellins describes two varieties of the caterpillar in "Larvæ of British Butterflies": "the darker having the ground colour black, slightly freckled on the

back with yellow; the dorsal line, which is interrupted by the dorsal spines, is of a velvety black edged with sulphur yellow; below the spiracles, which are black ringed with yellow, is a clear broad yellow line; the spines on the third segment are black, all the others pale yellow, set with black bristles, the other hairs pale; legs reddish-brown. The paler variety had the ground colour of a dull greyish-drab, the dorsal line of the ground colour on a more yellowish band, the lateral lines more distinct, the spines pink with white tips." In the same work, Mr. Buckler describes a more remarkable variety sent him by the Rev. E. Horton, on the 25th September, 1868, and which he found feeding on *Malva sylvestris*. Mr. Horton's attention was arrested by the mixed-up appearance of certain of the leaves. On examination, he found the edges of some were drawn together by threads into a kind of purse, each containing a caterpillar; and he noticed that in every case but one, the caterpillar was eating away the upper surface of the leaf within the purse. The youngest was an inch long, with seven rows of spines, all black in colour, except those in the dorsal and sub-dorsal rows on the sixth, eighth, and tenth segments, which were pale primrose yellow; the head and upper surface of the body black, with a double dorsal stripe of pale yellow, and a stripe of the same colour above the legs: the underside and fore-legs deep olive-brown. After moulting the change in appearance was very great, and growth very rapid, the primrose yellow and black spines being replaced by others of a dirty greenish-yellow tint; but the extraordinary and puzzling feature now assumed was a dense covering of pale grey hairs, nearly as long as the spines, and almost hiding them. The spiracles were greenish-grey with black centres, the head black, and like the body covered with grey hairs. Now arises the question, writes Mr. Buckler, as to the how and why of the caterpillar's hairy coat. Had these mallow eaters become hairy through eating the downy mallows, whilst those feeding on thistles are clothed with spines alone? Or were they a second brood, thus clothed with hair for protection against possible cold weather in late autumn? On the 10th October, the caterpillar above described, after first suspending itself to the top of its dwelling, left its case and crawled to the gauze cover of its cage, and on the 11th suspended itself there, and became a chrysalis on the 13th.

The chrysalis is about an inch in length, and moderately stout; the head has a pair of very short blunt horns, and the anal spike is like a short curved leaf stalk ending abruptly, and set round with a ring of hooked spines. The Rev. J. Hellins had two varieties of coloration, the darker variety having the back pale dusky brown, finely dotted with black, and an interrupted stripe of pale pinkish grey glossed with gold down the middle, the sub-dorsal knobs golden, and outside them on the abdomen a stripe of pinkish grey; on the

underside the wing cases brownish, somewhat marked with the pinkish grey tint; the paler variety had all these same markings, but the dusky portions much less extensive, and the general colouring green with a golden gloss or lustre.—Extracted from “Larvæ of British Butterflies.”

Four different species of parasites, all belonging to the order Hymenoptera, have been bred from this butterfly, namely, *Limneria exareolata*, *Pimpla diluta*, *Bracon variata*, and *Apanteles emarginatus*.

Vanessa cardui is most uncertain in its appearance. Sometimes it will be scarcely seen at all, or will disappear from a locality for many years. Then it will come in such countless swarms that no satisfactory method of accounting for them has yet been discovered. In an ordinary way the butterfly emerges in August or September, retires for the winter in October, to appear again in the spring, when it pairs and deposits its eggs singly on the food-plant. Occasionally there is an earlier brood in June, which mixes freely with the hibernated specimens, and Mr. Buckler once bred a specimen in February, and Mr. Wilkinson one on the 20th of November. It may be seen on the wing at any time of year, even being enticed from winter quarters on Christmas Day by an unusual warmth of the sun. Some lepidoptera remain more than one winter in the chrysalis state, only a portion of a brood emerging, or the whole remaining over. When this occurs the insect does not appear at an unusual time, but remains until its regular period of emergence the following year. Some species, such as the Small Eggar (*Eriogaster lanestris*), have been known to pass as many as ten years in the chrysalis state. The cause of this curious habit is not known, but in species which emerge in February, as does *Eriogaster lanestris*, it is easy to see that it is necessary for the protection of the race. Mr. McLachlan (see Entomologists' Monthly Magazine for July, 1879), records living chrysalides of the Clouded Yellow (*Cotias edusa*), the produce of eggs laid by the butterflies of 1877, and thinks that its life in that state can be prolonged over several years. The Goat Moth (*Cossus ligniperda*), again, passes three years, and sometimes more, in the caterpillar state. A most wonderful instance of the instinct of self-preservation is shown by *Oeneis bore*, Schu., a true hyperborean butterfly, which has never been found outside of the Arctic circle, and even there only occurs in places which bear a truly Arctic stamp. The caterpillar of *Oenis bore* hibernates below the surface of the ground, feeds and grows all through the following summer, but does not succeed in attaining its full size, it then hibernates a second time, and does not assume the chrysalis state till the spring of the following year. It is also probable that *Vanessa cardui* and other species, when the summers are unsuitable, or whatever other adverse causes there may be, pass a longer time in the chrysalis or some other

state, and then, when the circumstances are favourable, they appear in large numbers.

The caterpillars of the Painted Lady are almost as uncertain in their appearance as the butterflies. They have been found freely in July, and one observer, Mr. West (see "Entomologist," Vol. III., page 303), noticed that none were to be seen between July 26th and September 16th, when they again appeared freely. Another observer, Mr. Wilkinson (see "Entomologists' Monthly Magazine," Vol. XVII), records unusual numbers of the caterpillars in the end of July, 1879, and again the beginning of October. Most of the latter changed into chrysalides between the 18th and 20th of October, and one of them emerged as a perfect butterfly on November 20th, as fine in every respect as those bred in August. The rest failed in the attempt to come to maturity. Mr. Gervais F. Matthew (see "Entomologists' Monthly Magazine," Vol. XVIII., page 93), records the caterpillars as being very plentiful in Turkey, throughout September, October, and November, 1878, between united leaves of mallow; and also at Malta, in March, 1879. Albin, in 1749, records the finding of a caterpillar on the 22nd of June.

Vanessa cardui is a most cosmopolitan species. It occurs all over the British Isles, inclusive of the Shetlands; and Mr. W. F. Kirby, in his Diurnal Catalogue, gives the World as its range. Specimens from India and South America can scarcely be distinguished from those occurring in this country. On the American continent it enjoys a very wide range, extending from the Hudson's Bay territory to Venezuela. In the Old World its range extends from Norway to the Cape of Good Hope; and it has also been recorded from such far distant lands as Australia, New Zealand, and the Sandwich islands. It appears to be little affected by climate, as it occurs both at Sierra Leone (the hottest part of Africa), and at Moose Fort (lat. 50° 20' N) in North America, where snow lies on the ground for eight months of the year, and during five months of which the thermometer does not rise above freezing point, and sometimes sinks as low as 52° F. As it is a strong flyer, and of a roving disposition, it may, like *Danaus plexippus*, have extended its area in comparatively recent times.

Nearly everywhere it appears to be common, and in many places, especially in the South of Europe, it is one of the most abundant butterflies. Here it is sometimes observed in countless swarms, and the air is sometimes filled with the butterflies. These vast swarms apparently appear in early summer, and generally travel in a north-easterly direction. The year most remarkable for these swarms was the wet, sunless, and ungenial year of 1879. In this year, a winter of exceptional severity was followed by a sunless and chilly

spring, and then by a summer and early autumn remarkable for excess of rain and deficiency of heat.

The first published notice in England of the extraordinary numbers on the continent was that which appeared in the "Times," of the 13th June, 1879, to the following effect:—"A strange occurrence is reported from the Wet-zikon, Canton Zurich. On Saturday, the Commune was invaded by an immense swarm of butterflies, a kilometre (five-eighths of an English mile) wide, and so long that the procession took two hours to pass. They were of the kind known in Switzerland as *Distelfalter*, which feed on nettles and thistles. They flew from two to ten mètres above the ground, and went off in a north-westerly direction."

A swarm, starting from North Africa, was observed at Algiers as early as 15th to 20th of April, travelling in a north-easterly direction; it reached the neighbourhoods of Valencia and Barcelona by April 26th to 30th; spread over Spain, touching the Balearic Isles from May 1st to 3rd, and crossed the Eastern Pyrenees on May 26th and 27th. Another column crossed the Mediterranean to Sicily, and spread itself northwards over Italy in June; it then spread over south-eastern France, Switzerland, and Austria, and on the morning of June 5th, thousands of living specimens were found on the snow at the Hospice of St. Gothard. It then spread over France, Germany, and Belgium, reaching Strasburgh as early as June 3rd to 9th, Bisheim in Alsace on June 8th, Angers and Rennes on June 10. Paris and its environs were not apparently reached till June 15th. In "Le Naturaliste," for July 1st, we read that at Sevres, near Paris, on June 15th, all day long, great swarms appeared flying from S.S.E. towards N.N.W., the wind being S.S.W. At Strasbourg, from the 3rd to the 9th of June, a similar occurrence was observed, the insect flying rapidly in innumerable quantities towards the north, and even in rainy weather. At Bisheim, on June 7th, and also at Kehl, on the same day, myriads flew in the afternoon, at the former place from the S.W., at the latter from the S.E., so that it is considered the columns were not identical. At Angers a similar thing was observed on June 10th, the direction being from E. to W., against the wind, which was not of much force. It was estimated that the number passing along a single street in one hour was from 40,000 to 50,000. From Montpellier, Albi, and other places in the south, analogous cases are recorded. Near Geneva, the swarm is said to have obscured the sun for several minutes. At Rennes, on June 10th, incalculable numbers flew from S. to N. with great rapidity; at 2 p.m. on that day the wind changed, and the direction of flight was altered towards the W. Sometimes from 20 to 30 passed in a minute, continuing for some time at the same rate.

The "Entomologische Nachrichten," of July 15th, relates that "in Württemberg, from the 1st to the 8th of June, an incessant migration from S. and W. towards N.E. and E. was remarked. At Wetzikon, Canton Zurich, on June 7th, an immense swarm moved from S.W. to N.E., principally from 3 to 5 p.m.; their flight was persistently in one direction, only changing temporarily to avoid houses and trees. At Wetswell, on the same day, from 2 to 5 p.m., a swarm flew from W. to E., and it is calculated there were 1000 in the space of 10 mètres, and that at least 11,000 flew past the observer." The editor adds that no such swarms had occurred in the North of Germany, but information had been received from Steyer, in Upper Austria, "that on June 11th, surprising numbers flew from S.W. to N.E. ceaselessly, between 1 and 2 p.m., 90 to 110 per minute were counted in a breadth of about 100 paces, and the swarm is estimated at above, rather than under, 1,000,000." In England, during May and June, the number of apparently hibernated examples was unusually large, and these were probably re-enforced in the middle of June by emigrants from the Continent. At Torquay, in South Devon, *Vanessa cardui* and *Plusia gamma* occurred simultaneously on June 10th, in the greatest profusion; and at Bournemouth, Hants, in August, *V. cardui* was swarming in thousands and *P. gamma* in tens of thousands. The former is even recorded as plentifully through the streets of Liverpool, and the latter as being very abundant as far north as Pitlochrey in Perthshire.

Both species were most abundant during August at Ostend in Belgium, Saxony, Switzerland, and other parts of Europe. *Vanessa cardui*, singularly enough, appeared the same year, in considerable abundance, in the Sandwich Islands (see "Entomologists' Monthly Magazine," Vol. XVI., p. 161.), the season being, probably, as much cloudier and more showery than usual, as in Great Britain. An earlier flight is recorded in Loudon's "Magazine of Natural History," Vol. I., p. 387, thus: "On the 8th or 10th of June, 1829, Madame Wolff and her family, established during the summer in the district of Grandson, Canton de Vaud, Switzerland, perceived with surprise an immense flight of butterflies traversing the garden with great rapidity. All these butterflies were of the species called the Painted Lady, the *Belle Dame* of the French, the *Papilio cardui* of Linnæus, and *Vanessa cardui* of the present system. They were all flying closely together in the same direction, from south to north, and were so little afraid when any one approached, that they turned not to the right or left. The flight continued for two hours without interruption, and the column was about ten or twelve feet broad. They did not stop to alight on flowers but flew onwards, low and equally." The editor goes on to say "This fact is exceedingly singular, when it is considered that the caterpillars are not gregarious, but are solitary from the

moment they are hatched. Professor Bonelli, of Turin, however, observed a similar flight of the same species in the March preceeding their appearance at Grandson. Their flight was also directed from south to north, and their numbers immense. At night the flowers were literally covered with them. Towards the 29th of March their numbers diminished, but even in June a few still continued. They have been traced from Coni, Raconni, Suse, &c. A similar flight is recorded, as having taken place in the year 1741, in Italy, by Mr. Locke, in the "Memoirs of the Academy of Turin." During the whole season, those butterflies, as well as their caterpillars, were very abundant, and more beautiful than usual." A similar flight was observed in 1836, in the Canton of Vaud, Switzerland. Another flight was witnessed by Colonel Drummond Hay (see "Entomologists' Monthly Magazine," Vol. IX., p. 149.) and recorded thus: "It was, as far as I can recollect, in the early part of the summer of 1842, while stationed in Video, a small island in the harbour of Corfu, that an extraordinary flight of the Painted Lady butterfly took place. The first part of the column reached the island about 9 o'clock in the morning, and continued steadily to advance in rolling masses of many thousands for upwards of three hours. Though the density of the column was at no time very great, yet it appeared to extend in breadth as far as one could see, having the appearance of black drifting snow, if I may so call it. By one o'clock, the flight had completely passed: the wind at the time was blowing from the south-east. In the afternoon, on sailing up the channel of Corfu, the traces of the passage of the flight were very evident, from the quantities of dead butterflies which floated on the surface of the water; and for days afterwards, they were to be seen drifting into the various bays in the island of Corfu. I did not hear whether this flight had been observed on the Continent, but, as they appeared to be taking the direction of the coast of Italy, they would, in all probability, strike the land in the vicinity of Otranto."

The first in England to figure and describe it was old Mouffet, in 1633.

In Ray's "Historia Insectorum," 1710, we are informed that the Painted Lady occurs very frequently about Braintree, in Essex, and in other places.

Petiver in 1717, informs us that *Bella Donna*, or Painted Lady, usually settles on banks or dry ground.

Benjamin Wilkes, in his "English Moths and Butterflies," 1773, informs us that it spends fourteen days in the chrysalis state, and that it is not so common as the Peacock butterfly.

Eleazer Albin, in his "Natural History of English Insects," 1749, informs us that he found a caterpillar spun up in nettle leaves on the 22nd of June, from which, on the 15th of July, he bred a most beautiful Painted Lady butterfly.

In Harris' "Aurelian," 1775, we read "These flies are not very common, the reason of which is, all weathers do not agree with them, yet there are particular seasons when they are very plentiful, which happens once in about ten or twelve years. They are then often seen in town flying in the streets. There are various colours of the caterpillars, some appearing dark or nearly black, and others brighter and more of a yellowish cast. They are found covered with a thin spinning web on the upperside of the leaves, to secure themselves from the weather and other accidents. Within this web the caterpillar feeds, leaving the thin membranous part to support it in its habitation; so that the leaf appears to be eaten but half-way through. It forsakes its web when fit for its transformation, which happens about the middle of July, and finding a convenient place in the shade, fastens itself by the tail with a small but very strong web, and changes into a chrysalis, in which state the male and female may be easily distinguished from each other. The male is of a dark brown, embellished with gold. The female is rather brighter and ornamented with silver. The fly appears in about fourteen days."

Lewin, in his "Insects of Great Britain," 1795, informs us "that the female lays her eggs about the middle of June, carefully depositing them singly on a leaf, so that the stock of eggs the parent lays is sufficient for a number of plants in various places."

Donovan, in his "Natural History of British Insects," Vol. IX., writes, "The Painted Lady Butterflies, in some seasons, appear in considerable numbers, and then again are not seen for several years. They were taken in abundance in the summer of 1795, in many parts of the kingdom, and particularly in Manchester; but since that time, few if any, have been met with."

Mr. J. F. Stephen's, in his "Illustrations of British Entomology," 1828, writes, "*Cardui* is eminently conspicuous for the irregularity of its appearance in particular districts of the country: in the metropolitan district it occurs about every third or fourth year most copiously, breeding even in the metropolis itself; during the season of 1826 it was very abundant, and a few appeared last spring. Dr. Leach informed me that he used constantly to see it in Devonshire, and Mr. Dale that he took it in the Isle of Bute, and on Arthur's Seat near Edinburgh."

The author of the "Journal of a Naturalist," published 1829, mentions some interesting instances of its irregular appearance, "owing to causes infinitely beyond the comprehension of the entomologist, seeming to require a succession and variety of seasons, and their change, and their springing into life we know not how. This was particularly obvious in the summer of 1815, and the two following, which were almost unceasingly cold and rainy, scarcely a moth or butterfly appeared. And in the early part of 1818, the season was

not less uncongenial; a few half-animated creatures alone struggled into being: yet this Painted Lady was fostered into life, and became the commonest butterfly of the year. Some years ago, perhaps 1808, a year in which both the Painted Lady and the Clouded Yellow occurred plentifully, he noticed that a quantity of earth was raised in cutting a canal, and in the ensuing summer, on the herbage that sprang up from this new soil on the bank, this butterfly was found in abundance, where it had not been observed for many years before."

A correspondent of the "Entomological Magazine" (see Vol. II., p. 114), states "that on the 8th of October, 1833, the numbers of this butterfly, in the neighbourhood of Tooting, Surrey, surpassed everything of the kind he had ever witnessed. It was highly delightful to see those lovely insects sporting from flower to flower—but the dahlia seemed to be their favourite. I cannot but suspect that they migrated from some part of the country; for, previous to that day, I had not seen a single specimen in the neighbourhood, and but very few since: again it was evident, they must have been winging their way for some time, as most of them were in a faded condition." The same circumstances are more strongly confirmed in a communication from Mr. Blyth, to the "Field Naturalist" (Vol. I., p. 470), who asserts that, "for a single day the species appeared everywhere in abundance, and the day after not one was anywhere to be seen."

The Rev. F. O. Morris informs us in his "British Butterflies," published in 1853, that the "Painted Lady was plentiful near Falmouth in 1849, but scarce in 1850 and 1851; in 1850 not one was seen near Stoke-by-Nayland, while in 1851 it was to be seen in extreme abundance there." In the same year it was common in Norfolk, Cambridgeshire, Dorsetshire, and other parts of England.

The Rev. J. Hellins (see "Entomologists' Monthly Magazine," Vol. II., p. 84), calls attention to the fact that *Vanessa cardui* was not only excessively abundant in 1865, but also varied much in size. "The smallest specimens," he goes on to say, "we took at Exeter, expanded less than 1" 11", whilst the largest measured very nearly 3" in expanse. One of these giants is remarkable, also, for a small white ocellus, edged with black, placed in the largest yellowish blotch of the fore-wings." In the same volume, Mr. F. Smith writes, "At the western extremity of Ilfracombe stands a parish church, passing behind which you enter a Devonshire lane; its beauty will be appreciated by every one who has visited Devon, and he will know how it winds, and turns, and winds again, until you arrive at a gate at its extremity that opens on to the breezy downs. The last fifty yards of the hedge, on the right hand of the lane, is covered by a mantle of ivy, which on the 9th of

October, 1865, was in full blossom; but the flowers were about hidden from sight by a countless multitude of butterflies and moths; it was one of the most beautiful sights I ever beheld. The multitudinous host only comprised two species of butterfly, *Vanessa atalanta* and *cardui*; scores of the former, but hundreds of the latter. The majority of them appeared to be overpowered by imbibing the nectar of the ivy blossom, and I had no difficulty in taking specimens between my fingers."

Vanessa Cardui was common all over England in 1868, and most abundant in 1879, and was also very common in 1884. In referring to the last mentioned year, Miss Hinchcliff (see "Young Naturalist," Vol. V., p. 263), writes, "At Instow in North Devon, three insects have appeared this autumn, in most uncommon proportions, viz.: *V. atalanta*, *cardui*, and *P. gamma*, they swarm everywhere. *V. cardui* and *P. gamma* appeared together in 1879, in similar profusion and neither have been seen in any quantity since, *Cardui* especially, has hardly appeared at all. Now what can be the reason for two insects, apparently so dissimilar, suddenly re-appearing in large numbers, again in company, after a lapse of five years! The two seasons have certainly not been alike, 1879 was very wet and this as dry. They are all freshly hatched and very fine specimens." Another correspondent records *Atalanta* as appearing in unprecedented abundance in the neighbourhood of Glasgow, and *Cardui* as being also very plentiful. On reviewing the preceding pages we find that *Vanessa cardui* was common in England in 1795 and 1808, abundant in 1818, a cold and rainy season; common in 1826, 1833, 1849, 1851, and 1865, a fine hot year, most abundant in 1879, a cold wet year, and common in 1884, a fine dry season. In certain years it is very scarce, in 1887 for instance, I never saw a single specimen, and only half-a-dozen of *Atalanta*, whilst *V. urticae* occurred in profusion.

An allied species, *Virginiensis*, Drury, is sometimes included among the British butterflies under the name of *Huntera*, Fabricius, or the Scarce Painted Lady. It is very like *Cardui*, but the black markings are less extensive, and the underside of the hind-wings is reticulated with brown or green, with yellow lateral line and two dorsal lines formed alternately of white and red points. It is a common species in North America and the Sandwich Islands, appearing about once in five or six years in very great abundance, and has become naturalised in the Azores and Madeira.

An instance of the capture of this butterfly in England is recorded in Loudon's "Magazine of Natural History," Vol. III., p. 332, thus, "I beg to announce the capture of *Vanessa Huntera*, for the first time in Britain, by Captain Blower, at Withybush, near Haverfordwest, South Wales, about ten miles from a seaport, in July or August, 1828; which was, till very lately,

considered by him as a small and very odd variety of *V. cardui*, and which he has very handsomely added to my cabinet."—J. C. Dale.

Another example is recorded in the "Entomologist," Vol. IX., p. 255, as being taken by Miss Carew, on the 20th September, 1876, at Antony, near Torpoint, South Devon. The editor adds, "The above notice is interesting, as showing how insects from far distant localities frequently occur as foreign visitors to this country. There are several previous records of the occurrence of this butterfly in Britain, chiefly from our southern coast."

VANESSA ATALANTA.

Red Admiral.

ATALANTA, Linn. Atalan'ta, a celebrated beauty, native of Arcadia, who made all her lovers race with her, on the penalty of death if they could not catch her. Ovid, Met. X., 598.

In grand simplicity and vividness of colour, the Red Admiral perhaps surpasses every other British butterfly, and reminds one forcibly of some of the gorgeous denizens of the tropics. Intense black and brilliant scarlet in bands and borders are the two chief elements of this splendour, relieved delightfully by the pure white spots at the outer and upper corners, and by the pretty blue spots at the inner and lower angles and near the margins. On the underside the hind-wings are brown and beautifully mottled with black and grey, with a large triangular pale spot in the middle of the costal margin, and two transverse and wedge shaped discoidal black marks. Near the margin of the wing is a row of four obscure eye-like patches. In some specimens the red bar of the fore-wings bears a small white dot near its hinder extremity: these are apparently the females. The width across the wings varies from two and a half to three inches.

Varieties are scarce. Two are figured in Mosley's "Varieties of British Lepidoptera." One, bred by Mr. Eedle, has the scarlet bands replaced by pale yellow shading to orange. The other, bred by Mr. Vaughan, has the bands much paler than usual and abruptly shortened at the anal angle. One in Mr. Robson's collection has deep orange bands, that on the hind margin of the lower wings being without the usual black spots. The underside varies still more than the upper, but is not easily described; however, the red band is much larger, and more of a blotch, the blue is more suffused, and the hind-wings are without the usual mottling, and with the pale shade at the hind margin much wider. In a specimen bred in 1867, and figured in the "Entomologist," Vol. XI., the scarlet markings of the upperside of the anterior wings are partially suffused with yellow, and the white spots towards

the apex are very large. It is difficult, say the editors, to describe the variation of the underside, but the two conspicuous blue spots are very remarkable.

The egg is oblong, with six sharp edged longitudinal ribs coming over the edge of the top, in the centre of which lies a large circular plain spot; the colour of the shell is a dark green, the ribs being pellucid.

The caterpillar is variable in colour, sometimes being almost black, and at other times soft grey with buff coloured spines; the general colour, however, is grey freckled with yellowish green. The head and legs are black, and claspers red. The body is set with seven rows of branched spines, longer than those of *Cardui*, but not so long as those of *Io*. It feeds solitarily on the leaves of the common sting-nettle, and also the pellitory of the wall (*Parietaria officinalis*). The young caterpillar, after selecting a suitable leaf draws it together by the edges, and lives within the retreat thus formed. When it requires a larger domicile it leaves the old one and forms another, but is never to be found feeding exposed; when removed from its retreat it feigns death, bending its extremities together; all its movements are slow and lethargic, and its only object, when exposed, appear to be again to conceal itself.

The chrysalis is long and stout, but somewhat rounded and much angulated; the colour is reddish grey, delicately reticulated and marbled with black: it appears covered with bloom, like that on a ripe plum, and is adorned with very beautiful golden spots. Albin, in 1731, says he found some of these chrysalides gilded all over, and that they produced a brood of small but very beautiful Ichneumons. No less than half-a-dozen parasites, belonging to the order Hymenoptera, have been bred from *Vanessa Atalanta*, viz.: *Amblyteles armatorius*, *Hemiteles fulvipes*, *Limneria cursitans*, *Mesochorus sylvarum*, *Microgaster subcompletus*, and *Pteromalus puparum* figured by Albin; *Mesochorus sylvarum* being a hyper-parasite on *Microgaster subcompletus*.

The butterfly rarely emerges from the chrysalis before September, being thus later in its appearance than its congeners. It remains on the wing till the beginning of November, so long as the ivy is in bloom and the frosts not too severe, when it hibernates. It does not emerge from its winter quarters so early as other hibernating species, and is very seldom seen. The sexes do not pair much before June, and then the female deposits her eggs singly on the leaves of the common nettle. The caterpillars are to be found in June and July; the chrysalides in August.

Vanessa Atalanta has a very wide range. It occurs all over Europe except in the extreme north. It is found in Asia Minor, in North Africa, and in the Mauritius, and also in America from Hudson's Bay to Mexico. In more

southern latitudes it is replaced by *Callirhoë*, which has a range from Teneriffe to China. In New Zealand it is represented by the beautiful *Gonerilla*, and in the Sandwich Islands by *Tammeamea*. *Dejeanii* supplies its place in Java, as *Itea* does in Australia. It is common all over the British Isles, inclusive of the Shetlands. Nettles are very much weeds of cultivated ground, and especially are apt to be close to a farmhouse or the out-buildings. It is in such places, therefore, that we should look for the caterpillar or chrysalis, but the butterfly itself is so strong on the wing that distance is little object to it. Indeed the name *Atalanta* is said to have been selected for it by Linnæus on account of its great speed on the wing and powers of flight.

The first in England to figure and describe it was old Mouffet in 1633.

In Ray's "Historia Insectorum," 1710, we are informed that the Admiral is frequently to be seen in Warwickshire among pear trees, and about Braintree in Essex.

Petiver in 1717, records it as being often seen in fields and gardens.

Albin, in his "Natural History of English Insects," published in 1749, gives the following account: "The caterpillars feed on nettles, I found them on the 17th of July in the leaves, folded or spun together; they shelter themselves after this manner that they may be secured from the too great heat of the sun, rain, birds, and a small Ichneumon fly, which often hinder their coming to perfection. I fed them on nettles till the 24th of the same month, at which time the caterpillar hanging itself up by the tail within the folded leaves, changed into a chrysalis, out of which, on the 6th of August, came a most beautiful fly called *Papilio major nigricans, alis maculis rubris and albis pulchræ illustratis*, the Admirable Butterfly. Some of the chrysalides seemed as if gilded with burnished gold; out of these came a brood of small, but very beautiful Ichneumons."

Wilkes, in his "English Moths and Butterflies," 1773, calls it the Admirable Butterfly, and informs us "that the caterpillar turns in August to a chrysalis, hanging perpendicularly downwards by the tail. Fourteen days after the chrysalis is formed, the fly appears. A small Ichneumon fly often hinders their coming to perfection, by laying its eggs therein, which eggs are of such a glutenous nature, that they stick fast as soon as laid."

In Harris' "Aurelian," 1775, we read, "The female Admirable is seen to lay her eggs about the latter end of June, disposing of her eggs singly one on a leaf, and at such a distance from each other that sometimes her store of eggs will be extended or distributed over two or three fields. This she does for the more certain security of some of them; and so careful is she for the safety of her young brood, that I have often perceived her, when about to

lay an egg, creep in among the nettles, which I imagine is not only to place the egg from the heat of the sun, but likewise to see if any of those nettles are frequented by ants, these creatures being very destructive to caterpillars. When the caterpillars are full-fed, they generally fasten themselves up by the tail within their spinnings, and change to the chrysalis, though they may sometimes be found in that state hanging openly under a leaf or any other place they find convenient. Why they change, thus naked and exposed, contrary to their nature of concealing themselves in this state as well as that of the caterpillar, is what, with any certainty, cannot be accounted for: but the reason that appears most likely to me is, the earwigs, which often, in great numbers, get into their inclosures, oblige them to retire, and, being near the time of their transformation, are too weak to make a fresh spinning; for I have often found, when in search of the caterpillar, their spinnings crowded with these vermin. They lay in chrysalis twenty one days. The female is larger than the male, and may be known by an additional white spot which is situated in the red part of the upper wing."

Lewin, in his "Insects of Great Britain," 1795, writes, "The latter end of May a few of these butterflies make their appearance on the wing. In June the female lays her eggs. As soon as the caterpillar comes from the egg, he encloses himself in a leaf of the nettle, by drawing the edges together with a fine silken thread, to protect him from the injuries of the weather, and also from the *Ichneumon* fly; which by injecting its eggs into the caterpillar, prevents his coming to perfection, and most grievously torments the living animal, as the caterpillars of the *Ichneumon* feed in him. The caterpillars are full-grown the end of July, when they fasten themselves up by the tail, within their webs, and change to chrysalides. Sometimes they may be found hanging under the leaf, or any other convenient place. Why they change thus exposed, in contradiction to their habit of concealing themselves, as well in this state as that of the caterpillar, is what cannot be easily accounted for. The reason that appears most likely to me is, that the earwigs and ants get into their enclosures, and oblige them to retire, when they are near the time of their transformation, and they are too weak to make a fresh spinning. They lie in the chrysalis state near twenty days, when the butterfly comes forth. What a change! from a crawling caterpillar on the earth, to the elegant and beautiful butterfly, sporting in the air, and feeding on the honey juice of every fragrant flower."

Stephens, in his "Illustrations," 1828, writes, "This common species is one of the most splendid of the British butterflies; the intense black of the upper surface of the wings being beautifully relieved by the red fascia and pure white spots, and beneath, the marmoration of the posterior wings defies

the efforts of the finest pencil. It frequents lanes where nettles abound, throughout the southern part of Britain, appearing about the middle of August. It is said to be very destructive to cherries and other fruits. Mr. Haworth informs me that he once met with them so abundant, that above a dozen might be taken within the compass of two or three square yards."

Mr. Lukis, in recording familiarities effected with butterflies in Loudon's "Magazine of Natural History," Vol. VI., writes, "I approached a plum tree, where several individuals of *Vanessa atalanta* were busily employed in feeding on the rich juice of the ripest fruit. Whilst watching their motions, I perceived several wasps and flies hovering about the fruit, and attempting to light on it. This was no sooner done than they were driven away by the butterfly: any resistance manifested by the wasp exasperated the butterfly, which would boldly approach the intruder, flap its wings at it, and again become the sole possessor of the fruit: the action of the butterfly was very similar to the flapping of the pigeon's wing when feeding in company with others of its kind."

In 1845, *Atalanta* was recorded by Doubleday and others as being absent.

In the "Entomologists' Monthly Magazine," Vol. II., Mr. Frederick Smith records a multitudinous host of butterflies, on the flowers of the ivy, in a Devonshire lane, near Ifracombe, on the 9th of October, 1865. The host consisted of only two species, *Atalanta* and *Cardui*, scores of the former but hundreds of the latter.

Miss Hinchcliffe, in recording a similar instance at Instow, North Devon, in the "Young Naturalist," for 1884, adds "*Atalanta*, though always considered common, is not an insect that as a rule appears in any great abundance; one sees a few specimens every spring and autumn, but that is all, now it is everywhere,—gardens, fields, hedgerows, &c., and not in twos and threes, but in dozens, and all specimens just hatched. I caught ten in a few minutes in one corner of our garden, where some rotten apples seemed rather an attraction, and could have taken nearly double that number every day, sometimes there were five or six waiting to be taken—a truly lovely sight." In the same magazine, Mr. McKay writes, "In this neighbourhood, *Atalanta* has occurred in unprecedented abundance, and *Cardui* has also been very plentiful. The appearance of *Atalanta* is looked upon in this locality as something very unusual, but this year (1884) one collector alone has taken as many as thirty specimens. I believe it is two or three years since *Atalanta* was last seen near Glasgow."

It may be observing that although the three species, *Atalanta*, *Cardui*, and *Gamma* were very common in 1884, still *Atalanta* was not abundant in 1879, the year in which the two latter appeared in their greatest abundance.

SUB-GENUS VANESSA.

This differs from the last in having the wings more angulated, palpi more hairy, in the club of the antennæ being rather less pointed, and in the caterpillars having no spines on the head. There is also a difference in the habits, the caterpillars of *Vanessa* being gregarious, those of *Pyrameis* being solitary. The perfect insects differ from one another in some points of structure; for example, *Vanessa Io* has the anterior tarsus of the male nearly cylindric, whilst that of *Urticæ* is, as it were, strangulated near the middle, and that of *Antiope* offers two strangulations. Again, the anterior tarsi of the females differ in some slight degree: the articulations in *Io* being much more distinct than they are in *Polychloros* or *Urticæ*, and the proportions of the joints are slightly different.

In Martin Lister's edition of "Goedart's Insects," published at London, in 1685, we find the following account of the chrysalis of one of this genus: "Sine Larva Papilionis, Gracie Chrysalis appellatur, sine res deaurata, ut ex notatione Nominis patet. Latine non datur nomen (quod sciam), quo exprimatur: Ego transluli Aurelian. Ut cunque Latini Bruchum vocant Erucam: Quod quidem vocabulum (ut ex loco quodam in vitruvio conjectæ) veteri Tuscorum Lingua viride æris significans, inde transfertur ad Bruchum designandum. Sunt enim Brucha quidam, quos ipse Languedociæ agens compexi, qui communi quodam Tithymalli genere pasti; colore cœruleo sine cyaneo insignitur pinguntur. Adeoque sicut pancarum Chrysalidum deauratio, uniuersis nomenclationem dedit, pari etiam ratione unius cujuscumque Erucæ color cœrulens, eadem eodem nomine insigniuit. Quod ad deaurationem ipsam, nil aliud esse autumo, quam succi cujusdam, inter Erucæ pelluculam, et Chrysalidis restulam, quam regit, evaporati, spumam sine recrementum."

This sub-genus contains about two dozen species, which are inhabitants of the northern temperate zone, extending probably round the world. Their geographical range is extensive, and the species of the Old World are, to a certain extent, represented in the New World; and one species, *Antiope*, seems to be common to both. *Vanessa Urticæ* of Europe, is represented in America by *Milberti*; and the *V. album* of Eastern Europe has its exact counterpart in *F. album* of the Northern States of America. Six species are European, four of them occurring in the British Isles.

Another species, *Velleda*, Fab., now referred to the genus *Junonia*, was recorded as British by James Petiver, in his "Papilionum Brittanniæ, Icones, Nomina, &c.," published in 1717, as follows: "Papilio Oculatus Hampstediensis, ex aureo fuscus. Albin's Hampstead Eye, where it was caught by this curious person, and is the only one I have ever seen."

The Rev. F. O. Morris, in his "History of British Butterflies," published in 1853, writes, "The only specimen of this insect that has ever been recorded, was captured at Hampstead, near London, by Albin, and then first described and figured by Petiver. It has since been continuously figured and described by succeeding entomologists, who have faithfully copied the original picture." Just after the publication of Mr. Morris' work, the following skit appeared in a newspaper: "TOM.—'Jack! whereabouts is Amstid-am.' JACK.—'Well, I can't say exackerly, but I know its somewhere near Ampstid-Eath.'"

Specimens of *Velleda* are in the British Museum, and other collections, from the Islé of Amsterdam *alias* Australia, where it was taken by Sir Joseph Banks, President of the Royal Society, who sailed round the world with Captain Cook.

VANESSA IO.

The Peacock Butterfly.

Io, Linn. I'o, a Grecian heroine, famous for her beauty and misfortunes.—Ovid Met. i. 588.

The ground colour of this beautiful butterfly is a dull deep red on the upper side, and the hind margins are brown. On each fore-wing is one small and one large black costal mark, beyond which is a large eye-like spot, variously coloured with yellow, black, red, bluish lilac, rosy, and white: on each of the hindwings also is a large black eye-like spot shaded with bluish lilac, placed in a pale brown ring near the outer angle. The colour of the underside is totally different, being composed of shades of funeral blacks and browns; thus exhibiting a strange effect when the butterfly, sitting on a flower head, alternately opens and shuts its wings with a fanning motion, according to its custom.

The width across the wings varies from two inches to three inches and a half, the females, as is generally the rule, being the largest.

Varieties are rare, and hundreds of specimens may be examined without any difference being perceived except in size. I have a specimen, taken at Hull in 1837, in which the eye-like spot on the hindwings is replaced by a white blotch. A more curious one is figured in "Mosley's Varieties of British Lepidoptera." In this the eyed-spots are wanting on all the wings: the hind-wings being of a dark stone colour, with only a black spot on a lighter shade, where the eyed spot should be. Similar specimens exist in collections, and the variety has been called the "Blind Peacock." There is a splendid variety in Mr. Bond's collection; it has the costa, half down the hind-margin, and a dash inside of the eyed-spot on hind-wing pure white. Sometimes the

wings are very thinly scaled, and the dull red changed into chocolate. Two varieties have been named, *Ioides*, Ochs., and *Sardoa*, Staud., Cat. The first is smaller, and the latter, which occurs in Sardinia, larger than the type.

The egg, admirably figured by Sep., is oblong, with eight highly elevated ribs, and is of a grass green colour with a black cover at the top.

The caterpillar is black and velvety, long, rather slender, and with well marked segments; the body is covered with long black branched spines, and numerous white warts; the head is large, black, and shining, having warts sprinkled over it; the legs are black, and the claspers flesh coloured. It feeds on the common stinging nettle (*Urtica dioica*), in June and July. Mr. Hellins says the caterpillars are irritable when disturbed, both walking quickly and flinging about their heads, and ejecting from their mouths a dark greenish fluid. They feed together in families.

The chrysalis is long, stout, and mostly cylindrical, though a little angulated, the skin wrinkled. The head has two triangular diverging horns, the back of the thorax rises in an abrupt curve, and has in the middle a short spike, it falls in at the waist, whence the abdomen goes in a long curve to the tail and is set with sub-dorsal rows of spines, and the abdomen ends in a long stem-like spike. There are two varieties of colour, one pale greenish yellow, the other pale grey, but freckled all over with smoky black. There is a metallic lustre, and the wing cases and antennæ cases are marked out by lines of freckles. According to Albin, it is subject to the attack of a Hymenopterous parasite, which appears to be *Pteromalus puparum*.

The butterfly emerges in August, and appears to hibernate earlier than the Red Admiral. It re-appears in spring.

Vanessa Io is common throughout the year in Central and Southern Europe, and Western and Northern Asia as far as Japan. It is said to be absent from Andalusia and Sicily, and is rare in Northern Europe, including Scotland. It is generally distributed in England and Ireland, but most common in the South. In Scotland it is rare, and does not occur beyond the Caledonian Canal.

It was figured by Thomas Moufet, in 1633, accompanied with the following description: "Omnium Regina dici potest; nam extremis abi, veluti adamantes quatuor in pala Hyacinthina radiantes, miras opulentias ostendunt, imo fere adamanti Hyacintho oculum effodiunt. Lucent enim pulcherrime (ut Stellæ) Scintillasque iricolores circumfundunt: his notis ita dignoscitur, ut reliquum corpus describere (licet varius pictum coloribus) supervacaneum esset."

It is also figured and described in Martin Lister's edition of Goedart, 1685.

Petiver in his "Papilionum Britannicæ, Icones, Nomina, &c," published in 1717, informs us that the Peacock's Eye often appears early and continues long, and that it is pretty common both in gardens and fields.

Albin, in his "Natural History of English Insects," 1749, informs us that the caterpillar, when touched, lets fall from his mouth a drop or two of dark green liquor, but for what reason he could not judge; as it is not hurtful to to any part of the shin where it falls; and that it is subject to the same production of Ichneumons as that of *Atalanta*.

Harris, in his "Aurelian," 1770, writes, "The female Peacock layeth her eggs the latter end of April or the beginning of May, on the top part of the nettle, placing them generally on the stalk close under the young budding leaves, to preserve them from the too violent heat of the sun, where they are hatched in a few days. The young caterpillars inclose themselves in a very fine tender web, drawing at the same time the leaves to cover them as much as they can, that they may receive the benefit of their shade: in the first skin they are of a greenish-white, and appear naked and shining, which appearance continues till they are in their fourth skin, at which time they become quite black. After the shifting of each skin they extend their web further, and will sometimes divide themselves into two or three separate colonies. When they are in their last skin they quite forsake their web, and feed separate. When full-fed they hang themselves up by the tail, and in about twenty four hours, the skin slips off as the chrysalis appears, which at first is green and tender; but one hour is sufficient to harden the shell against the injuries it might receive by the plants being shaken by the wind. In about nineteen days the fly appears. They continue in the fly state during the winter, and I have seen them flying in February, when the snow has been on the ground."

Lewin, in his "Insects of Great Britain," 1795, adds "The insects of this species are very plentiful, and spread themselves everywhere."

Newman, in his "British Butterflies," 1871, states that he once found more than 40 Peacock butterflies inside of an old hollow oak; and that it is a common species in England and Ireland, but scarce in Scotland.

In the "Entomologist," Vol. VI., it is recorded as being very common in 1873 and scarce in 1872, by Mr. Stevens, who goes on to say, "of *Atalanta* and *Cardui* I have not seen a specimen, and I have not heard of anyone taking *Antiopa*."

In the "Young Naturalist," for 1885, Mr. Robson writes, "When I commenced to collect, the caterpillars of *Vanessa Io* might be found on every patch of nettles. I have not seen them for many years, and rarely observe the perfect insect. The same remark applies to many other places."

It was fairly common in Dorsetshire in 1886.

VANESSA ANTIOPA.

The Camberwell Beauty.

ANTIOPA, Linn. Antio'pa, the mother of Amphion, who is said to have built the walls of Thebes.

The arrangement of colours in this butterfly is most remarkable and unusual, by reason of the sudden contrast between the whitish border, and the velvet depth of the colours it encloses. The inner portion of all the wings is of a rich purplish chocolate, then comes a band of black, containing six or seven blue spots on each wing, and on the outside is a broad white or yellowish white border: the forewings have two whitish costal spots beyond the middle. On the underside, the wings are ash brown, with a great many slender transverse black lines, and white margins and spots on the upperside. The width across the wings varies from a little under three inches to three inches and a half. The form of this butterfly that usually occurs in Britain has a whitish border to the wings. This is the variety *Hygiea*, Hdrch., the type having an ochre yellow border. M. Wurzburger, however, writing to the "Entomologist," Vol. XX., p. 136, states that when the butterfly leaves the chrysalis, in July, it has a yellow border; in spring, after hybernation, its border is paler, sometimes light yellow, often quite white: and that the specimens of *Antiopa* which have sometimes been caught in England have come from the Continent, and are hybernated specimens having white borders. It may be remarked that the borders of *Io* also occasionally fade white after hybernation. The American variety, *Lintneri*, Fisch., differs only from the European in the buff border being more irrorated with black dots.

The egg appears to be undescribed.

The caterpillar is black, with a brick red spot on each segment, from the fourth to the eleventh, and black spines. The head and legs are black, claspers dull red. It feeds on birch, poplar, and more commonly on willow, especially the white willow (*Salix alba*), in June and July, but has very seldom been seen in England.

The chrysalis hangs suspended by the tail. It is of a dark and dingy blackish brown colour, speckled with blue and spotted with tawny; in form it closely resembles that of *Polychloros*, except that the spiky points are longer and sharper.

The butterfly makes its appearance at the latter end of summer, and there is more difficulty perhaps in understanding its irregularities than with any other British species. Sometimes it shows itself in very large numbers as in the years of 1789, 1846, 1872, and 1880, and occurs all over the country; far inland as well as on the coast. Then it will disappear altogether for years,

or appear only singly. It is powerful enough on the wing to cross the North Sea with a fair wind from almost any part of the Continent. It is seldom seen in England in the spring, but a specimen in the collection of Mr. J. E. Robson was taken on the 8th February, 1869, crawling out of some burning underwood near Castle Eden Dene, County of Durham.

Vanessa Antiopa is common during most of the year in the greater part of Europe, North Africa, Northern and Western Asia, and North America from the Hudson Bay Territory to Venezuela. It is absent from the Steppes of South Russia, and is very uncertain in its appearance in Britain, and in some of the adjacent parts of Europe.

The first account of its occurrence in England is given by Benjamin Wilkes in his "English Moths and Butterflies," published in 1773, thus, "The Willow Butterfly—about the middle of August, 1748, two of this species of butterfly were taken near Camberwell, in Surrey. But in all my practice I have never seen any of them in the fields; so they must be looked upon as very great rarities. They are very common in Germany, and Mr. Rosel tells us, the caterpillar feeds on willow, and may be found all the summer."

Moses Harris, in his "Aurelian," 1766, writes, "The Grand Surprise or Camberwell Beauty.—This is one of the scarcest flies of any kind known in England, nor do we know of above three or four that were ever found here, the first two were taken in the month of August, 1748, in Cool Arbour Lane, near Camberwell, the last in St. George's Fields, near Newington, the beginning of that month; but as these appeared very much faded and otherwise abused, I conclude they appear from the chrysalis, with the Peacock, about the middle of July, and being of that class it is reasonable to suppose they live through the winter in the fly state, and lay their eggs in spring that produce flies the July following; for in the same manner do all the flies of this class, and as all that have been taken were found flying about willow trees, it is the common opinion of Aurelians that their caterpillars feed thereon, but their caterpillar and chrysalis, is to us entirely unknown, and the food a mere conjecture. I intend to make a strict search concerning them, and should I make any discoveries worthy note, I shall find a proper place and repeat it. The fly in the plate was drawn and coloured from a beautiful large female in the cabinet of Charles Belliard, Esq., which is the finest we have in England."

Lewin, in his "Insects of Great Britain," 1795, writes, "Three of these beautiful and rare insects were taken in the year 1748, near Camberwell, in Surrey; from which time until the year 1789, we have no account of any being seen in England. The middle of August, 1789, I was surprised with

the sight of two of these elegant flies, near Faversham, in Kent; one of which I thought it great good fortune to take, but in the course of that week I was more agreeably surprised with seeing and taking numbers of them in the most perfect condition. One of my sons found an old decoy pond of large extent, surrounded with willow and sallow trees, and a great number of these butterflies flying about and at rest on the trees, many of which appearing to be just out of the chrysalis, left no room to doubt that this was a place where they bred. In March, 1790, a number of these insects were flying and soaring about for the space of twelve or fourteen days; and then as if with one consent, they migrated from us and were no more seen."

Donovan, in his "Natural History of British Insects," Vol. III., published in 1794, writes, "*The Papilio antiopa* is found in every part of Europe; in Germany particularly it is very common, and is as frequent in America as in Europe, and is esteemed as a rarity only in this country; it is indeed, sometimes found in abundance with us, but as its appearance is neither annual nor periodical, it is generally valued by English collectors. There have been several instances of its being found in different parts of this country in mild seasons, as plenty as the Peacock, or Admiral Butterflies; in the summer of 1793, particularly, they were as numerous in some places as the Common Garden White Butterfly is usually near London. But as a proof that its appearance does not altogether depend on the temperature of the weather, we need only adduce, that not a single specimen has been taken this season, although it has been one of the most favourable for all kinds of insects that can be recollected; and many species of moths and butterflies, which have not been seen for many years before, have been taken at Coombe Wood, Darn Wood, and similar adjacent parts, during summer, in plenty. The English specimens differ from those of other countries in the colour of the bright exterior border of the wings; in the former, that part is of a very pale yellow brown, inclining to a dirty white; in the latter, it is of a deep yellow, marked and spotted with brown, Fabricius notices this difference, and says they are varieties."

Haworth, in his "Lepidoptera Britannica," 1803, writes:—There is something very extraordinary in the periodical but irregular appearance of this species, *Edusa* and *Cardui*. They are plentiful all over the kingdom in some years; after which, *Antiopa* in particular, they will not be seen for eight, ten, or more years, by any one, and then appear again as plentiful as before. To suppose they come from the Continent is an idle conjecture, because the English specimens are easily distinguished from all others by the superior whiteness of their borders. Perhaps their eggs, in this climate, like the seeds of some vegetables, may occasionally lie dormant for several seasons, and not

hatch, until some extraordinary but undiscovered coincidences awake them to active life."

John Curtis, in his "British Entomology," 1825, writes: "Until four or five years since, *Antiopa* had not been seen for nearly forty years, when it was exceedingly abundant in different parts of the kingdom. In the year 1819, a few were taken in Suffolk, and Mr. Samouelle captured one the following spring that had lived through the winter, since which period it has not been seen."

Stephens, in his "Illustrations," 1828, writes: "No insect is more remarkable for the irregularity of its appearance than this. Till about the middle of the last century, few specimens had been observed; but about 60 years since it appeared in such prodigious numbers throughout the kingdom, that the Entomologists of that day gave it the appellation of the 'Grand Surprise.' Of late it has again become unfrequent; the last times that it appeared in plenty being 1789 and 1793, a few only having been captured subsequently. At the present day it still appears to occur occasionally throughout England, as Mr. Backhouse informs me that, about the year 1820, he saw vast numbers strewing the sea shore at Seaton Carew, Durham, both in a dead and living state, and also floating on the River Tees—and it has also been taken in the counties of Suffolk, Worcestershire, Surrey, Norfolk, Essex, Berkshire, Oxford, Kent, and Cambridgeshire, and I once saw one on a willow near Hertford."

Mr. George Wailes, in his "Catalogue of the Lepidoptera of Northumberland and Durham," published in 1858, writes, "About twenty years ago, I enquired of a very intelligent friend, who had passed his early life at Stockton, whether he had any recollection of ever having seen any such butterfly in his vicinity, and his reply was, 'that he knew it well, and that it went by the name of the "White Petticoat."' Mr. Wailes goes on to say 'No one who knows the insect can question the appropriateness of the name, or its application to this species,' and adds 'It would seem that the South Eastern corner of Durham has been rich in this fine insect.'

The Rev. F. O. Morris, in his "History of British Butterflies," published in 1853, writes, "The neighbourhood of Rawmarsh, near Rotherham, Yorkshire, is one of the most uniform localities for this rare insect I am aware of," and goes on to say "The year 1846 has been unusually productive of the species."

Mr. Stainton, in his "Manual," published in 1857, writes, "This insect is extremely irregular in its appearance, and has hardly been seen since 1847."

Mr. Barrett, in his "Lepidoptera of Norfolk," published in 1874, writes it *Antiopa*, "Usually a great rarity; but in August, 1872, it appeared in

all parts of the county, and was almost common in the North Eastern corner."

Vanessa antiopa was first taken in England in the year 1748, and was not noticed again till 1789, when numbers were seen in Kent during the month of August, and also in the spring of the following year after hibernation.

According to Donovan, it was very abundant in 1793, but curiously enough the fact is ignored by Lewin. Donovan also mentions that not one was to be seen in 1794, although it was a most favourable year for insect life generally, nor does any appear to have been met with again till 1819, when it was common, especially in Durham and Suffolk.

A few were taken in 1820 and 1821, and one was recorded as being taken in Hampshire in 1828, by the Rev. F. W. Hope; for 1833 there is one record, and two for 1834, two were recorded in 1835, one in 1837, and two in 1845. The year 1846 was unusually productive of the species, several being taken in the counties of Yorkshire, Norfolk, Suffolk, Essex, Kent, Surrey, Hampshire, Sussex, Middlesex, Hertfordshire, Lincolnshire, Bedfordshire, Nottingham, and Ayrshire. 1846 was a remarkable year with a mild winter. All the rare Hawk Moths were unusually common, and so was the Queen of Spain Fritillary. There was also a migration of Locusts and the White Butterflies; but very few Clouded Yellows.

It was scarce in 1847, and none appear to have been seen again till 1855, when one was taken in North Wales; scarce in 1856, one record in 1857, scarce in 1858—one being taken at Rannoch in April: several were taken in 1859 and 1860, one in 1862, and one in 1864; a few were taken in 1865 including one at Killarney, in Ireland, one in 1867, and one in 1869; it was scarce in 1870, and but one was taken in 1871.

Now comes its great year—1872, in which it appeared in greater numbers than it has ever been known to do before or since, especially in the North Eastern counties of England; and it was also abundant in Holland, from which direction the migration probably took place. In 1872, we had a cold backward spring and a rough stormy summer until the middle of August, when three weeks of glorious weather, with continuous easterly winds, supervened, during which the best part of the year's work was effected. At this period, so writes Dr. Knaggs, "the grand surprise" of the season was in store for us; three of our rarest butterflies—*Daphidice*, *Lathonia*, and *Antiope* turned up in such numbers as had never previously been heard of in Britain,—at any rate in the present century. *Antiope* especially, eclipsing all former displays within the memory of living man, and throwing into the shade the so-called "Great *Antiope* Years" of 1789 and 1846, for in those years the captures were recorded by tens only, whilst in 1872 they were reckoned by hundreds, mostly on the eastern coast from Dover, in Kent, to Forres, in

Morayshire; thus apparently upholding Mr. Stainton's theory—that the flight of *Antiopa* most probably came from Norway, especially as it was most plentiful between the Humber and the Tyne.

Several were captured in 1873, mostly hibernated specimens, one being taken in the month of January: a few only occurred in the autumn, the yellow borders to the wings suggesting that they were bred in England, and were the produce of the hibernated specimens of the previous autumn. In 1872, a single specimen only was taken in the spring—another proof that the numerous specimens recorded in the autumn were invaders.

In 1874, only a single specimen was seen, and that at Newcastle: in 1875, a few were recorded; in 1876, four specimens; in 1877, three only; and a few in 1878.

In the wet season of 1879, the great year for *Cardui*, not a specimen of *Antiopa* was recorded, although curiously enough it was common again in 1880. It was scarce again in 1881; in 1882, there is only one record, and none in 1883; it was also scarce in 1884, 1885, 1886, and 1887.

In the "Entomologist," Vol. XX, p. 156, Mr. Dingwell writes, "M. Wurzburger, who stated that *Antiopa* was never found in England in the caterpillar stage is wrong. I have an imago bred from one of the twenty seven caterpillars found on a willow, and of course with the yellow border. As the person who sent them gave them without even being asked, he would have no object in deceiving me." Mr. Capper also writes in the same magazine, "I have three British specimens with borders quite as yellow as three bred continental, which I have placed beside them for comparison."

VANESSA URTICÆ.

Small Tortoise-shell.

URTICÆ, Linn. Urticæ, from the generic name of its food-plant, the Stinging Nettle.

This is one of our most common butterflies, and therefore but little thought of in comparison with others of greater rarity. It is, however, a handsome species, and forces itself upon our attention by coming into our houses to hibernate. In its general markings it much resembles the Large Tortoise-shell, but the colouring is by far the richer and brighter.

It varies in the expanse of its wings from one inch and three-quarters to two inches and a quarter, the female being the largest, but specimens have been found which expand no more than one and a quarter inches across the wings. The prevailing colour is bright reddish orange, there being at the hind margins a dark band in which are situated semi-circular blue

spots. There are three large black spots along the costa of the fore-wings, and between the third and the tip of the wing is a white spot—one character which distinguishes it from *Polychloros*. The basal portion of the hind-wings is black, with tawny hairs. The underside is of an ash colour, with a large cream-coloured patch on the fore-wings, and a broad waved band on the hind-wings. Several varieties of this species are named. One, *Ichnusa*, Bon., is a very striking form, occurring in the isles of Corsica and Sardinia. The ground colour is much brighter in tone, the black spot on the inner margin of the fore-wing is nearer the base, and the two central spots are wanting. On the hind-wings, the dark basal patch does not extend so far across. Some consider it to be a distinct species. Mr. Newman figures a specimen taken at Hawkeshead, in Lancashire, and said by Mr. Gregson to be this variety, but the specimen is like *Ichnusa* only in the absence of the central spots, the other characteristics being absent. Mr. Newman's variety (3) is also without the central spots, but the two outer black costal blotches are conjoined, and the whole of the hind-wings are dark coloured. Mr. Robson has a specimen with fore-wings exactly the same as this figure, but the hind-wings are of the usual form. Mr. Newman's variety (2) has the middle costal spot united with that on the hind margin. A dark form with the spots united is named *Polaris*, and an intermediate form is called *Turcica*; the former inhabits the polar regions, the latter Turkey and Asia Minor. This is believed to be the variety *Ichnusoides*, De Selys. Mr. Kirby mentions another variety *Raschmirensis*, Violl., an inhabitant of Northern India. Two very extraordinary varieties are figured in "Les Feuilles des Jeunes Naturalists," for January, 1881. One of them was taken in Ireland, and is called *Osborni*, Donc. The other is in the collection of M. Donchier, of Donceel, Liege, but it is not known where it was taken. It is named *Selijsi*, Donc. Where one specimen only is known it does not seem worth while to give it a distinctive name. Mr. Mosley, in his "Illustrations," figures a specimen from the Rev. Harper Crewe's collection, in which the ground colour is a deep mahogany brown, and another showing a strong tendency to yellow. Specimens with a perfectly yellow ground colour are in Mr. Gregson's and other collections. In Mr. Robson's collection are some with the ground salmon colour, and another of a very rich bright hue. This last he picked out from a number flying to thistle heads, its richer hue being very conspicuous on the wing; the costal spots also are extra large and the yellow between them paler than usual. Very many other forms might be described from other collections if necessary.

The egg is somewhat pouch-shaped, being oblong and fuller at the base than above; the base is not flattened, but rounded and smooth, and just

where it slopes into the sides, the ribs (seven, eight, or nine in number) commence; these continue over the top for about half its diameter and increase in prominence as the egg itself diminishes, until at last, they quite stand out like clear glass beading; the space between the ribs is boldly fluted; the colour is a pale yellowish green.—Rev. J. Hellins, in “Entomological Monthly Magazine,” Vol. VIII. p. 53.

The caterpillar is yellowish grey, with a black dorsal blue, and spines branched, and of a greenish colour. The general appearance of the skin is velvety, the head has a shining skin, but is so studded with whitish grey bulbous based bristles that it looks greyish. The caterpillars at first are strictly gregarious, feeding on the leaves of the common stinging nettle (*Urtica dioica*), but, as they grow larger they wander away from each other, and do not return to close company, though remaining on the same clump of nettles.

The chrysalis is of a brownish colour, mottled with black and spotted with gold, particularly on the most prominent parts. It is much humped and angulated; and occasionally is very brilliant and apparently gilded all over, but this appearance appears to be caused by the presence of parasites. It is generally, but not always suspended from the underside of the stalks of the food-plant.

The following Hymenopterous parasites have been bred from it, viz. *Limneria uncinata*, *Apanteles spurius*, and *Pteromalus puparum*; and, also a Dipterus one, viz. *Exorista vulgaris*. *Ichneumon luctaterins* also has been reared from it on the continent.

There are two broods of the butterfly in the year. The first appears on the wing in June; and the second in July or August, which hibernates to reappear in spring, and then mingles freely with the freshly emerged specimens of early summer. Caterpillars also have been found both in May and July. A third brood has occasionally appeared.

Vanessa Urticæ is common everywhere throughout Europe, Western and Northern Asia, and North Africa. It is common in all parts of the British Isles, except the Orkneys, Shetlands, and the Outer Hebrides, but, as the food-plant is rather a weed of cultivated ground, than of waste or barren land, the butterfly is more abundant among the habitations of men, than in the wilder and more desolate parts of our islands. It is also a fearless and sociable species, frequently coming into inhabited rooms for hibernation, and has even been known to fly to lamp light at Christmas, when a room has been made unusually hot. Three specimens which took up their quarters on the ceiling of my staircase in August, 1886, with their wings folded and hanging downwards; remained perfectly stationary till Good Friday, the 8th of April, 1887, when they awoke from their winter's sleep, and took their

departure. In 1887, the June brood was unusually numerous, and individuals came into my house as early as July, to enter into their long rest, and were not even awakened by the hot weather of August. The summer brood was particularly scarce, and after August was well in, I never saw a specimen on the wing. Specimens, moreover, have been found hibernating in the crevices of chalk, more than a foot below the surface.

The first author in Britain to figure and describe it was Thomas Mouffett, in 1633.

Ray, in 1710, and Petiver in 1717, records it as being very common all through the summer, and also in houses throughout the winter.

Albin, in 1749, writes: "The caterpillar was taken on the 26th of May, feeding on the nettle, and on the 7th June some of them tied themselves up by the tail, and changed into a chrysalis; out of which came in fourteen days a fly called the lesser Tortoise Shell, from its wings representing the shell of that animal. This butterfly lives all the winter, and hides himself in cottages, old trees, and other places of refuge. The chrysalides are often found gilded, from whence it was called aurelia or chrysalis, which is now become the common name of the cases in which flies live while in this state. These produced a brood of small Ichneumons."

Wilkes, in 1773, writes: "The Small Tortoise Shell is very common and breeds twice in the year. The first brood is towards the end of June, the second about the end of August. The caterpillar may be taken full-fed about the middle of June and the middle of August."

The following interesting notice of a swarm of these butterflies in mid-winter is recorded by Mr. Banning, in the Isle of Man, see "Zoologist," Vol. XIV.: "Whilst standing in my farmyard on the day following Christmas Day, 1855, it being unusually fine and warm, I was suddenly astonished by the fall of more than a hundred *Vanessa urticae*. I commenced at once collecting them, and succeeded in securing more than sixty. These I fed on sugar spread over cabbage leaves and bran until now, and, to all appearances, those which still survive (more than forty in number) are thriving well, and in good condition.

VANESSA POLYCHLOROS.

Large Tortoise-shell.

POLYCHLOROS, Linn. Polychl'oros. Linnæus took this name from Aldrovandus, who says (Ins. III., 245), "Septimius Polychloros dici queat, propter colorem diversitatem." (The seventh may be called Polychloros on account of its varied colours). He seems to have confounded the Latin color with the Greek chloros, pale. A.L.

This butterfly resembles the Small Tortoise-shell in its general markings, but the colouring is much darker and duller, and it is a much rarer and more local species. It varies in the expanse of its wings from two inches and a quarter to three inches. Sometimes an unusually small individual may be met with smaller than an unusually large one of *Urticæ*. The prevailing colour is a rusty brown, there being at the hind margins a dark band in which are situated semi-circular blue spots. There are three large black spots along the costa of the fore-wings. Near the lower corner of the front wings is an extra black spot—one character which distinguishes it from *Urticæ*,—and on the basal portion of the hind-wings are tawny hairs. The underside is of an ash colour, with a broad waved band across the wings. It is the most constant of all our British butterflies in its markings, and the only specimen at all approaching variation I have seen is one in my own cabinet, in which the spots on the upper wings are rather suffused. A form on the continent with confluent spots is called *Testudo*, Esp., and another is called *Pyromela*, Fre.

The egg resembles a short, squat barrel, ribbed with eight or nine longitudinal even ridges, which extend over the flattened top, but appear to cease on reaching the base; the space between the ribs is transversely fluted, but much more finely than in the egg of *Urticæ*, although the latter is not half its size; the colour apparently is a dull green. The eggs appear to be deposited in close, regular order, on a twig of elm, after the style of *Clisiocampa neustria*.

The caterpillar is bluish, but more or less sprinkled with ochreous brown freckles on the black, and is clothed with ochreous branching spines. Elm appears to be its favourite food in this country, but many others appear to be eaten occasionally, viz., cherry (the tree generally preferred in France), pear, willow, aspen, wych elm, and white beam tree. It appears also that it will eat nettle, as an occasional caterpillar has been found in company with those of *Urticæ*.

The chrysalis is similar to others of the genus in general appearance, but the points at the head are more distinct than usual, being widely separated and well pointed. The butterfly emerges in July, but retires early for hibernation. They pair in April or May, and the eggs are laid in large batches on the twigs of the selected plant. The caterpillar is full-fed by the end of June. It does not remain more than a couple or three weeks in the chrysalis state.

Ichneumon luctatorius has been reared from it on the continent.

Vanessa Polychloros is a butterfly that frequents the borders or outskirts of large woods, or lanes well bordered with trees suitable for the caterpillars.

It sometimes comes to sweets, and is more frequently seen in the spring of the year after hibernation, than in the autumn. On the continent of Europe it is widely spread, being wanting only in the Polar regions; it is also found over the greater part of Asia. In England, it is most plentiful in the Southern counties, occurring less commonly in the Midlands, and very rarely in the Northern counties; where it is only an occasional visitor. Two specimens only have been recorded from Scotland, and none from Ireland. In America, it is replaced by a closely allied species *V-album*; and there is another still closer found in Eastern Europe, viz. *Xanthomelas*, generally occurring near rivers, the caterpillars feeding on smooth-leaved willows.

The first author in Britain to figure and describe it was Thomas Mouffett, in 1633.

John Ray, in his "Historia Insectorum," 1710, writes, "*Eruca è qua exit haec species non multum differt ab Urticaria: hoc anno (1695) plures salicis latifoliae folia depaxcentes inveni.*"

James Petiver, in his "Papilionum Britanniae Icones," 1717, writes "*Papilio Testudinarius major, Great Tortoise Shell Butterfly. A large fly. I have observed them both in autumn and spring, they often settle on trees, and commonly the elm.*"

Eleazer Albin, in his "Natural History of English Insects," writes, "The caterpillar was bluish spotted and bristled with yellow, the head and feet black. It was taken on the elm the 10th of June. The caterpillars, when young keep together, and when full-fed they ordinarily tie themselves up by the tail under the cappings of walls, or some such shelter, and change into chrysalis about the middle of June; and in the beginning of July produce a butterfly, commonly called the Great Tortoise-shell. From several of these chrysalides came broods of small *Ichneumon* flies."

Lewin, in 1795, writes, "They delight to settle on dry pathways, as also on the trunks of trees, to sun themselves. They fly swift, and are not easily taken, except in the morning, when they are feeding on the blossoms of different plants, near the place where they are bred. Some few of the late bred flies secrete themselves in the hollows of trees, or such places as will protect them from the severity of the weather, and live through the winter. The male is not so large as the female, but in colour and marks they perfectly agree."

Stephens, in his "Illustrations," published in 1828, writes, "This insect is also one of those which occasionally appear in profusion: during the past season it has been particularly abundant near London, occurring in plenty in Copenhagen fields, and near Ripley, in Surrey, last July. I captured in April last some faded specimens at the latter place, which had been produced

in the preceding year : near Ramsgate, Deal, and other parts of Kent, and also in the vicinity of Hastings, and in the New Forest, it likewise occurred during the past summer. There is but one brood, which appears about the middle of July."

Wailes, in his "Catalogue of the Lepidoptera of Northumberland and Durham," published in 1858, writes, "The claim of this species to be admitted into our local fauna rests at present solely on the authority of Wallis: In his "Natural History and Antiquities of Northumberland," published in 1769, enumerates nine species of butterflies and ten of moths. It is somewhat singular that for one of the former, the large Tortoise-shell Butterfly, he is as yet the only authority for its admission into our fauna. There is certainly every probability that future researches will enable us to corroborate his record of the species, though the paucity of the English elm in many part of the two counties, certainly does not add to the chances of success." Since this was published specimens have been recorded both in Northumberland and Durham, but not under circumstances to lead to the belief that the species was a native of either county.

Barrett, in his "Lepidoptera of Norfolk," writes, "Formerly common, but scarcer for some years, until the last summer, 1873, when it again appeared commonly."

In the "Scottish Naturalist," Vol. I., published in 1872, a specimen of *Polychloros* is recorded as being taken near Aberdeen, first in Scotland.

Newman, in his "British Butterflies," writes, "It is generally, although sparingly, diffused throughout the midland and eastern counties of England: its rarity in the north and west is very noticeable. The caterpillars were plentiful on elms at Darenth Wood, Kent, in 1830, and the butterflies of very frequent occurrence, at Lewisham, in the spring of 1856, after hybernation. The caterpillars were plentiful at Tonbridge, in 1869. It was very common round Colchester, in 1860, since rare. It is rather a feature in the history of this insect that it so often occurs singly: in the very numerous records I have received more than half speak of single specimens."

I have not seen a single specimen in Dorsetshire, since the wet summer of 1879.

SUB-GENUS GRAPTA.

Kirby.

The species of this sub-genus may be easily recognised by the peculiar shape of the wings, the inner margin of which is deeply emarginate; the caterpillars also may be distinguished by the tubercular processes on the head.

All the known species have the upper surface more or less brightly fulvous, spotted with black. The lower wings have on the underside a more or less angular silvery or pale golden mark, resembling sometimes the letter L or C.

The geographical range of the genus is nearly confined to the temperate regions of both the Old and New Worlds. Three species are found in the United States of North America, one in Mexico, and one in California; one in China; and two in Europe. Of our European species, one inhabits the more northern and central portion, including England; the other prefers the shores of the Mediterranean, and I have seen it in profusion flying about and settling on the walls of the Acropolis, at Athens: it is named *Egea* by Cramer, and the caterpillar feeds on *Parietaria officinalis*.

VANESSA C-ALBUM.

The Comma.

C-ALBUM, Linn. C-al'bum, so called from the white C like mark on the underside of the hind-wings.

The singularly jagged outline of this insect at once distinguishes it from every other of our British butterflies, though it might be taken for stunted, deformed, and torn specimens of some of our other species, so similar is it in colour and the plan of its markings.

The wings expand from an inch and three-quarters to rather over two inches. On the upperside they are of a bright fulvous with dark hindmargins and base, and several dark brown spots and a few paler ones. On the underside they are elegantly variegated with transverse streaks of rich brown, whitish grey, grey, and metallic green, in which latter are small black specks. The hindwings, as has already been mentioned, have a white C, or comma-like mark in the centre.

Mr. Newman, in his "British Butterflies" observes, "There are three very constant varieties in the colouring of the underside, the characteristics of which may be described as repletion, variety, and depletion: in the first, the brown is dark, dull, and uniform; in the second, it is richly varied with different shades of brown and metallic green; and in the third, the colour seems partially bleached, and assumes a tinge of fulvous yellow. Mr. Dale, one of our best lepidopterists, regards the first and third of these varieties as a first and second brood. Mrs. Hutchinson, who is better acquainted with this butterfly than any other entomologist in the kingdom, considers the uniformly dark brown specimens to be females, and the richly varied specimens to be males. Accepting these views as correct, there remains a little

difficulty in the extreme uniformity of colouring in all the fulvous or vernal specimens: they are certainly not all of one sex."

This difficulty may be met by stating that the underside of the male and female of the autumn brood differs greatly. On the other hand, the summer brood is so constant in its appearance, that Mr. Robson has called it *Hutchinsoni*, in compliment to that lady whose liberality has enriched so many cabinets with specimens.

There is also an extraordinary variation in the outline of the wings. In some specimens the incision in the outer margin of the fore-wings (extending from the first branch of the median vein to the main branch of the post-costal vein) is so deep that it forms nearly a semicircle, whilst in others it is scarcely more than a sextant: the other indentations being equally varied. Mr. Haworth alludes to this in his "*Lepidoptera Britannica*," observing, "*Femina paullo pallidior et subinde minus lacinata.*"

Petiver, in his "*Papilionum Britannicæ Icones*," 1717, gives four kinds of *Comma*, viz:—

"*Subtus fusca.* The Silver Comma."

"*Subtus pallidior.* The Pale Comma. This below is of an oker marble, and paler than the last."

"*Alis magis laceratis.* Jagged winged Comma. These wings are deeper cut and more vivid; it is finely marbled underneath, with small greenish eyes, speckled with black."

"*Minor.* Small Comma. It is very dark below, and in all parts less."

A variety occurs in Siberia with the spots confluent, as is the case with so many boreal forms: this has been called *F-album*, by Esper. I have in my own collection a singular variety taken near Doncaster, given to my father by the Rev. F. O. Morris, in which all the black spots on the hind-wings are run into one large patch; and there is also a very dark specimen in Mr. Howard Vaughan's collection.

The egg is somewhat elliptical, standing on end, the lower, which is the largest, being flattened underneath: it has ten projecting ribs. It bears very much the appearance of a miniature gooseberry; and is of a bluish green colour, the ribs being of a whitish green.

The caterpillar is of a dark brown on the underside; on the upperside it is fulvous to the seventh segment, then white to the middle of the twelfth segment, which is so remarkably distinct that the caterpillar may be known by this mark, which looks as if a drop of white paint had just fallen on it, and was still wet and shining. The head is of a dark brown, and is distinguished by two minute tubercles with small branched spines, looking like horns. The whole of the body is covered with similar branched spines, which are of a fulvous or whitish colour.

The chrysalis, suspended by the tail from the underside of a leaf, is very contorted in figure. The head is rather flat, and has two straight horns, which are prolonged at the tips; the back of the thorax rises up sharply to a thin squared central projection, and then falls in again abruptly; and the wing cases are prominent. It varies in colour from dark to light brown, with bright silvery blotches. In some places the chrysalides are known by the name of "silver grubs."

Two parasites, belonging to the Hymenoptera, have been bred from it, viz : *Pimpla flavonotata* and *Pteromalus puparum*. The caterpillar appears to be less fastidious in its food than others of the genus. It is reported as feeding on hop, elm, currant, gooseberry, and nettle. The second brood would appear to prefer hop, but as that plant is scarcely in leaf when the first brood are feeding, the early caterpillars must of necessity find other food.

There are two broods in the year. The caterpillars may be found in May or June, and the butterflies in June or early in July. Then when the hop-picking season comes on, the caterpillars and also the chrysalides are found in much larger numbers, producing butterflies in September, October or even later. These undoubtedly hibernate, and re-appear in March or April, thus remaining six or seven months in the perfect state; whilst the summer brood does not live a tenth part of the time. This, Mr. Robson suggests, would account for the extra abundance of the autumn brood, as such a much larger proportion of the summer butterflies are able to deposit their eggs. See "Young Naturalist" Vol. II., p. 110. The butterflies which emerge in June or July, are always of the pale form, and are produced from eggs laid by the hibernated females. *Vanessa c-album* frequents woods, gardens, lanes, and fields, being particularly fond of bramble blossom and fruit, and of plums and apples when decaying. It occurs all over Europe, except in the Polar Regions, and in Greece and Turkey where it is replaced by *Egea*. It is found also in Northern and Western Asia. In North America it is replaced by many allied species; one of which, *Interrogationis*, likewise feeds on the common hop, to which it often does immense injury. In the summer of 1838, Mr. Edward Doubleday saw the hops in a garden at Ashville, North Carolina, entirely destroyed by them; and the roof of a long verandah was hung with the chrysalides, suspended so closely together, that, the webs by which they were attached being united, he was able to pull them down in masses of thirty or forty at a time. A large portion was attacked by their brilliant little parasite, to which Dr. Harris has given the name of *Pteromalus vanessæ*. *Vanessa c-album* is a local insect in England and Wales, and does not occur in either Scotland or Ireland. Only one specimen is recorded from Northumberland, and only one locality has been reported from Cumberland,

It has entirely disappeared from many places where it was formerly common.

The first English author to describe and figure it was Thomas Mouffet, in his "Insectorum Sine Minimorum Animalium Theatrum" published in the year 1633.

It is also briefly described by Dr. Christopher Merrett, F.R.S., in his "Pinax rerum Naturalium Britanniarum," published in 1667, being the first publication which gives any account of British insects exclusively.

It is described in Ray's "Historia Insectorum," 1710, in the following words, "*Papilio ulmarie similis, sed minor, alie lacinatis interioribus lineola alba increta notatis. Papilio testudinarius alis laceratis*, D. Petiver."

Moses Harris, in his "Aurelian," 1770, writes, "The caterpillar of the Comma Butterfly, which generally feeds on the leaves of the hop, but is sometimes found on the nettle, is very slow of motions, and may be taken from the latter end of July to the middle of August, about which time it suspends itself by its tail to the branches, or underpart of the leaves of the hop by a web, which, though very fine, is so strong that unless great care be taken in separating them, you will pull the caterpillar asunder; it hangs in this manner about twenty-four hours, then changes to the chrysalis, in which state it remains about fourteen days, and then produces the butterfly, called Comma from a white mark on the underside of the under-wings, resembling that stop in printing. The female is larger, her colour paler, and her wings not so much indented as those of the male. This fly hides itself during all the cold season, and appears again in the month of April, much faded in its colour, when it lays its eggs on the young sprouts of the hop and nettle, which are hatched about the middle of May, go through the same changes as above, and produce a fly by the latter end of June, which lays the eggs that produce the first mentioned caterpillar."

Lewin, in his "Insects of Great Britain," 1795, writes: "A few of this species of butterfly, if the winter has proved mild, lie in the winged state till the spring, and appear in April much wasted in colour, with their wings broken at the edges. Others remain in chrysalis till that time, and may be easily distinguished by their perfect shape, and the brightness of their colour. It is an insect swift in flight, and difficult to take, except when feeding. It flies in lanes, by the sides of banks, on hedges, frequently settling on dry places, and against the bodies of trees."

Donovan, in his "Natural History of British Insects, Vol. VI., published in 1797, writes: In colour and markings the Comma Butterfly seems at first allied to the Tortoise-shell, but the elegant scallops of the margins of the wings sufficiently distinguishes it from every other British species, indeed wings indented in this remarkable manner are rarely seen in any insects,

those from foreign countries not excepted. There is more than one brood in the year; the butterflies are generally found in June, the second brood late in August. The caterpillars are sometimes found in February, but oftener in July; they remain about a fortnight in chrysalis."

Stephens, in his "Illustrations of British Entomology," published in 1828, writes: "This species has become somewhat scarce everywhere within these few years. Prior to 1813, I used to find it very abundantly near Hertford, but since that period I have not seen it. It has, however, occurred during the last and present seasons in several parts of the country; and it appears to be generally distributed over the southern half of the kingdom, and Mr. Backhouse informs me that it is abundant near York."

Miss Jermyn, in her "Butterfly Collector's Vade-Mecum," published in 1837, writes: "The Papilionaceous insects, in general, soon after their emergence from the chrysalis, and commonly during their first flight, discharge drops of red-coloured fluid, more or less intense in different species. This circumstance is peculiarly worthy of attention from the explanation which it affords of a phenomenon often considered, both in ancient and modern times, in the light of a prodigy: viz. the descent of red drops from the air, which has been called a shower of blood; an event recorded by several writers, and particularly by Ovid, among the prodigies which took place before the death of Julius Cæsar.

" With threatening signs the lowering skies are filled,
And sanguine drops from murky clouds distilled."

This highly rational elucidation of a phenomenon, at first view so inexplicable, seems to have been discovered by the celebrated Pierese, at Aix, in Provence, where a shower of this kind fell in 1608. The common people were terrified with the apprehension of some great calamity; but that intelligent Naturalist, enquiring into the affair with minute attention, was fully convinced that these drops were scattered by an innumerable swarm of *Vanessa c-album*, hovering in the air; he preserved several of their caterpillars in a glass, which after transformation discharged these drops of blood. This discovery ruined two hypotheses, which had been supported with equal ability, one, that it was the work of evil spirits, the other, that these drops were formed from red exhalations precipitated again in rain."

Newman, in his "British Butterflies," 1871, writes: "A noticeable feature in its distribution is its absence from what may be called maritime lists, as those from Norfolk, Suffolk, Kent, Sussex, Isle of Wight, Dorsetshire, Devonshire, and Cornwall; this absence from the lists is not sufficient evidence of the butterfly's not occurring there, but certainly of its great rarity. In the midland counties, on the contrary, it is of frequent occur-

rence, and in some of them absolutely abundant; then again, the cultivation of its food-plant, the hop, does not seem to exercise that influence on its choice of localities that might be expected; it abounds in the district where the Worcester hops are grown—namely, Worcestershire and Herefordshire—but it is rarely observed in the Farnham district—namely Surrey, or in the Kent district.”

It was very common in Dorset in 1807, but after 1816 none were seen until 1877, when a specimen was taken near Dorchester. Prior to 1813, J. F. Stephens used to find it very abundantly near Hertford, but none since that year; and Edward Doubleday met with it at Epping, in Essex, about 1817 or 1818. A few were taken in Norfolk as recently as 1861, and also in Yorkshire and Durham; but it appears to have almost deserted the southern counties, and entirely the metropolitan. It occurred very abundantly on the banks of the Wye in 1858; and in Herefordshire in 1875, but the wonderful abundance of 1875 was followed by a nearly total absence of the species in 1876 and 1877, during which years Mrs. Hutchinson did not obtain a single egg, caterpillar, or chrysalis, and but one butterfly only. In 1881 it was very abundant again, both in the caterpillar and chrysalis state, and in 1883 it occurred rather freely at Llandudno, in North Wales. It appears to have been very scarce in 1884 and 1885, but very plentiful again in Herefordshire, in 1886 and 1887. In 1886, wild chrysalides were found in July, August, September, and October, the last butterfly appearing on October 27th; there apparently being three broods in that year.

GENUS XIX.—ARGYNNIS.

ARGN'NIS, a surname of Venus, from the Temple erected in her honour by Agamemnon, on the death of his favourite Argynnus.—Proper IV., 6., 22.

This is a genus of about one hundred species.

They inhabit northern and temperate climes, about one-third are European, and nearly an equal number occur in Asia and North America. One is found in Australia, and but few in South America. One only appears to inhabit Africa, and few of the Asiatic species get so far south as India. Three occur in Greenland and one as far north as Grinnel Land. Six species are recognized as British, of which one is but an occasional visitor. The species distinguished from those of the following by the underside of the hind-wings being adorned with spots or stripes of the most brilliant silver. The colour of the upperside a bright fulvous spotted with black. The English name of Fritillaries appear to have bestowed on the species of this and the following genus from the markings on the upperside resembling those on the old fashioned chequered flowers termed “Fritillaries.”

The costal margin of the fore-wings is arched, and the species have a bold and graceful flight. The antennæ are rather short, terminating in an abrupt pyriform club.

The anterior legs of the males are fringed with long delicate hairs, and those of the three first species have the median nervules clothed with hairs and scales of a peculiar form. The caterpillars are long, cylindrical, and clothed with numerous bristly spines, arranged in whorls round the body; each segment having a whorl of these spines. They feed entirely on the different species of the genus *Viola* or Violets.

The genus has been divided into two sections. In the first of which the second joint of the palpi is much swollen. In the second, which contains two British species, *Euphrosyne* and *Selene*, the second joint of the palpi is not remarkably swollen.

ARGYNNIS PAPHIA.

Silver Striped Fritillary.

PAPHIA, Linn. Paph'ia, a surname of Venus, from the island of Paphos.

This Fritillary expands, in the width of its wings, from about two inches and three quarters to three inches. On the upperside they are of a rich fulvous with a greenish tinge towards the base with longitudinal black spots and bars. The female is without the broad black borders to the veins of the fore-wings which are so prominent in the male, and the black spots are larger. On the underside the hind-wings are of a greenish shade, with silvery hind-margins, and one long and two short silvery stripes: hence the English name of silver striped is most appropriate.

A well known variety of the female is not uncommon in the New Forest, and also in Dorsetshire, Sussex, and other southern counties of England. It has the usual fulvous ground colour replaced by a dark smoky greenish brown. It is spotted in the usual way, but near the tip there are a few light patches: this is known as *Valezina* of Esper. A worn male in the collection of Mr. Bond, is said to be the only known male of this variety. In one, figured by Hubner, the wings on the right-hand side are of this variety, and those on the left as in the ordinary specimens. A similar one to this was taken in the New Forest, Hampshire, in 1879: and I have a very extraordinary hermaphrodite taken likewise in 1879, in the New Forest by Mr. Charles Gulliver; in which the two wings on the left-hand side are male, and on the right-hand side female. But the upper-edge of the fore-wing of the latter side is of the usual fulvous colour, and one-third of the lower-wing is so coloured; so that, to use Mr. Jenner Weir's expression in the "En-

tomologist," Vol. XII., p. 206., "in one insect both gynandromorphism and dimorphism existed." Specimens are not very rare in which the black spots are confluent: and stray specimens have occurred with a white spot on every wing. Another very remarkable variety is figured in the "Entomologist," Vol. XV. In this, the partial melanism of all the wings is correlated with the obliteration of the silvery markings on the underside, with the exception of a pearly patch at the base. A variety, without any silver stripes on the underside of the hind-wings, occurs in Southern Europe and Western Asia, and is named *Anargyra* in Staudinger's catalogue.

The egg in shape is like a dumpy cone, laid erect on the flattened end and rounded off at the top; the shell with about twenty tolerably prominent longitudinal ribs, some not reaching to the top. The colour is, at first, of a pale greenish yellow and glistening, but it turns paler in about a week, with a leaden grey patch near the top.

The young caterpillar, on hatching, breakfasts on the egg shell: it is short and rather stout, and of an ochreous yellow with a shining blackish brown head. On its first appearance in spring, the caterpillar is no more than one-eighth of an inch long, having apparently moulted but once before hibernation. After another moult, some time between April 12th and 20th, the spines appear, they are alike short and stumpy, pinkish brown in colour, with black tips and branches. The head and body are now black, with double lines of whitish violet on the back. When full grown, it measures from about one and a half to one and five-eighths of an inch in length, and is in proportion rather stout. Down the whole length of the back are two stripes of brilliant yellow separated by a black dorsal line; these stripes are relieved by a black, velvet-like borderings of markings. The spines are now of a reddish ochreous colour, with their extreme tips and branches black. It feeds on the leaves of the common violet, and changes into a chrysalis in the beginning of June.

The chrysalis, about an inch long, when seen sideways is deepest across near the end of the wing covers, and the largest projecting points. It is of a pale brown colour, with gold spots on the back, and on the tips of the prominences. On each side of the back is a row of obtuse, tapering, prominent points; a larger pair at the head are suggestive of ears.

Two Hymenopterous parasites, *Amblyteles homocerus*, Wesm., and *Hemiteles melanarius*, Gran., have been bred from it.

The butterfly is on the wing during the whole of the month of July and August, and is rather difficult to capture owing to its partiality to the flowers of the bramble.

It occurs all over Europe, except in the extreme north, in Western Asia,

Siberia; and China, where at Kingiang, all the females hitherto taken strangely enough are of the variety *Valezina*. It is a frequenter of woods, and may be found in open places, on the outskirts of almost every extensive wood in England. It seems to be equally abundant in Ireland, but scarce in Scotland, not occurring north of Perthshire.

It is first recorded as a British species in Ray's "Historia Insectorum," 1710. He calls it "The greater Silver-streaked Fritillary," and writes: "Ostendit nobis D. Dale utrumque sexum."

Wilkes, in his "English Moths and Butterflies," 1773, informs us that it is most commonly found in woods, and the fields adjacent to woods.

Lewin, in his "Insects of Great Britain, 1795, writes: "The caterpillar of this superb butterfly is not yet discovered in England. The fly is on the wing at the end of June; and is not uncommon on the sides of woods, and in the lanes near them. I suppose, that the old name of fritillary, given to this butterfly, and the nine following species, is from their resemblance to that flower, in their checkered markings on the upper wings. The caterpillars are remarkable for their rough and ugly appearance, being covered with long hairy spines; this formidable figure is their great protection from insectivorous birds; which however fond of smooth caterpillars, do not care to touch these. They are very fearful, for, on the least motion of the plant or leaf they are on, they drop to the ground, and the spines prevent their being bruised in the fall."

ARGYNNIS AGLAIA.

Silver-spotted Fritillary.

AGLAIA, Linn. Aglā'ia, one of the three Graces.

This Fritillary expands in the width of its wings from two inches and a quarter to two inches and three-quarters. On the upperside they are fulvous spotted with black, the female being the darker both in the ground colour and markings. On the underside the hindwings are greenish, and partly tawny, being splendidly studded with about twenty silvery spots; the forewings have marginal silvery spots towards the tip. The wings are more rounded and not so pointed as those of *Paphia*.

A variety differing from the type by having some of the silvery spots near the base much larger, two pairs of them coalescing, has been named and figured by Sowerby, in his "British Miscellany," under the name of "*Charlotta*," in compliment to Queen Charlotte, the Consort of King George the Third. It appears to be least rare in the North of England.

The Scottish specimens are much darker than the English; and I have a very curious variety taken by Leplastrier, at Dover, many years ago, in

which the fulvous ground colour is replaced by a milky drab, and the black spots by fulvous spots. I have also a hermaphrodite, in which the wings on the left hand side are much smaller than those on the right. Like *Adippe*, it also varies by the enlargement and coalescing of the black spots.

The egg is very similar to that of *Adippe*.

The caterpillar is of a dark shining violet grey, thickly marbled with velvety black. It has six rows of black spines, branched, with short black hairs. The spiracles are black, delicately margined with grey, and close below each spiracle is a blotch of bright orange red. The head is black, shining, and hairy. It feeds on the leaves of the dog and the sweet violet (*Viola canina* and *odorata*), and hibernating young, feeds up in the spring.

The chrysalis is of a shining, blackish brown, with paler markings; and is very much curved in outline: on the upper surface are two rows of blunt conical projecting points. It is suspended by the tail to the underside of a leaf, the surface of which it covers, when a caterpillar, with a circular mass of silk, thickest in the centre, to which the anal hooks of the chrysalis are attached in a horizontal position, the back of the abdomen being so much curved round towards the leaf as to imitate the upper two-thirds of the letter S.

The butterfly may be found on the wing in July and August, and frequents the sides of hills, coast sandhills, and heaths.

It is more generally distributed than *Paphia*, and is the commonest of the large Fritillaries throughout Europe, and Northern and Western Asia. In Scotland it ranges as far north as Sutherland, and I have met with it in the Isle of Skye. It also appears to be common in Ireland. Some closely allied species are found in California.

It is figured and described in Moufet's "Insectorum Sine Minimorum Animalium Theatrum," 1633.

Petiver, in his "Papilionum Britanniae, Icones," &c., 1717, informs us that the Great Silver-spotted Fritillary appears about the midst of July.

Wilkes, in his "English Moths and Butterflies," 1773, writes: "On the 15th July, 1748, I had three eggs laid, and on the 5th of August the young caterpillars came forth. They were of a flesh colour, with rows of black spots on each joint, like the caterpillars of the Emperor Moth, and out of each spot grew hairs of a sandy colour. The eggs were beautifully fluted down the sides, were flat at the bottom, and had a glutenous mixture upon them, which occasioned their sticking fast wherever the fly chose to leave them. The caterpillars on this present 10th of February, 1749, seem to be alive, but are very small, and, I believe, have eaten nothing all the winter, though they have had grass given them, which I take to be their proper food."

Sowerby, in his "British Miscellany," 1806, writes of the var. *Charlotta*, "Some years ago the Rev. Dr. Charles Abbott discovered this curious Fritillary in Bedfordshire; and we do not know that it has been found by any one else. The nineteen silver spots on the under part of the lower wing are very constant. It is an elegant insect, well deserving an honourable name, and comes near to *Aglaia*. As we have, comparatively speaking, but few *Papilio*s in Great Britain, it is a very desirable acquisition. This gentleman first added *P. paniscus* to the British list."

Curtis, in his "British Entomology," 1830, figures a very dark variety of *Aglaia*, which he informs us were taken by Mr. John Seaman, in the parish of Nacton, near Ipswich, the 7th of July, 1827. He goes on to say: "For an intermediate variety, which was captured at Dover, I am indebted to Mr. W. Christy: it is singular that these specimens vary from the type no less in form than in colour, which is not the case I believe with *Charlotta*."

ARGYNNIS ADIPPE.

High-brown Fritillary.

ADIPPE, Linn. Adip'pe. Linné says: "In Faunâ Cydippe perperam pro Adippe legitur." It seems probable that *Adippe* is merely a variation of *Cydippe*, one of the Muses, made in consequence of the latter name having been already appropriated to another species.

This Fritillary expands in the width of its wings from two inches and a quarter to two inches and three-quarters. On the upperside they are fulvous spotted with black. On the underside the hindwings are of a greenish brown, with about twenty silvery spots, the silver on the marginal spots being indistinct; between the marginal and central rows is a row of small dull red spots with bluish centres, which at once distinguishes this species from *Aglaia*.

This species varies both by the enlargement and coalescing of the black spots, and by a change in hue of the ground colour. A very beautiful specimen is in Mr. Gregson's collection, in which the greater portion of both wings is black. Mr. Stevens has one with the spots as usual, but the ground colour is a very pale drab. Others occur in which it is a rich mahogany brown, while intermediate varieties are found. Several varieties of the under side have been named. *Cleodoxa*, Ochr., has the usual silvery spots of the underside pale yellow or very slightly silvered. This form has sometimes occurred in England, but it is commoner in Greece and Sicily. I possess a specimen of it, which was taken near Bedford, by Dr. Abbott, and mistaken for *Niobe*. *Chlorodippe*, H.S., is greener on the underside than the normal

form, and has more central silvery spots. It has been taken by Mr. Gregson near Windermere, in Westmoreland, but is apparently common in Spain. *Cleodippe*, Staud., another Spanish variety, resembles the last, except in the want of the silvery spots.

The egg in shape is conical, the base broad, having a central depression, the sides are very boldly ribbed and reticulated, some ribs being longer than others. When first laid it is of a glistening light ochreous green, but gradually changes to a dull pink.

The caterpillar at first is of a brown colour, with a shining black head, and is decidedly hairy. When full-grown it is about an inch and a half long and stout in proportion, of a dingy pinkish brown minutely freckled, the spines being of a pinkish ochreous. Like the rest of the genus it feeds on the leaves of the violet, and can run at a pace quite equal to the fastest caterpillar of *Arctia caja*.

The chrysalis is of a pitchy brown, with a row of dorsal diamond shapes of less intensity of colour, the margins of the wing-covers deep brownish ochreous, the spiky projections golden and brilliantly glistening. It has two rows of rather blunt pointed obtuse projecting spines, and the thorax is keeled ("Buckler's Larvæ.")

The butterfly is on the wing in July and August. The eggs apparently do not hatch before February or March, and the caterpillars change into chrysalis in June.

It is a rarer species than either *Paphia* or *Aglaia*, and seems to occur both in woods and on uncultivated hill sides. It is found all over Europe, except in the Polar regions, and in Western Asia. In England it is widely but not generally distributed, but in Scotland is only found in the extreme south such as Dumfriesshire, and does not appear to occur at all in Ireland or the Isle of Man.

It appears to have been first recorded as a British species by James Petiver, in his "*Papilionum Britanniaë*," 1717. He records it with the last as appearing about the middle of July.

Lewin, in his "*Insects of Great Britain*," 1795, writes: "Violet Silver-spotted Fritillary. These elegant butterflies make their first appearance on the wing the latter end of June, mostly in lanes near woods in dry situations; and are easily caught when feeding on the bramble or thistle blossoms: but as the sun advances towards the middle of the day, they are restless, sporting and flying with great swiftness, at which time they are very difficult to take, The female lays her eggs in July, on the violets that grow under the shelter of bramble, or some similar cover, or dry banks, or hilly places. The caterpillars are produced in about twelve days, and feed till September, when they

spin a fine web at the root of their food, close to the ground; and under this cover they pass the winter in a torpid state. In February or March, according to the mildness of the spring, they begin to feed again, at this time they are but small, of a dull black colour, and thick set with short-blunt spines, finely haired. As spring advances they increase in size, and in May are full-fed. The beginning of June they prepare for their transformation, suspending themselves by the tail, and in a few hours the chrysalis appear. In this state they remain for three weeks; when the first fine morning brings them out to dry and expand their wings, ready for flight. The female differs but little from the male,"

J. F. Stephens, in his "Illustrations of British Entomology," 1828, writes of *Adippe*: "Not quite so abundant as *Aglais*, but frequently met with in the woods near London, at the end of June and through July. It is also found in Essex, Suffolk, Norfolk, Bedfordshire, Berks, Dorset, Devon, and Hants; in the latter county very commonly in the New Forest."

An allied species, viz., *Niobe*, Linn., has been recorded as British. Stephens, in his "Illustrations of British Entomology," writes of it: "Stewart gives this as a British species, but without any authority; I may say, however, that among the insects purchased by Mr. Dale, from the professed indigenous collection of the late Dr. Abbot, of Bedford, was a single specimen of this species, which was considered by the Doctor as a variety of *Adippe*" (and rightly, J. C. Dale).

Curtis, in his "British Entomology," 1830, writes: "*Niobe*, Linn. Godart thinks this is the *Adippe* of Linnæus; and the same opinion might lead Stewart to record it as a British insect. Dr. Abbott's English collection contained a specimen, which Mr. Dale now possesses; and as it is found in Sweden and the South of France, there is nothing unreasonable in believing that it may occasionally make its appearance in this island."

The next record is of a single specimen which was taken in the New Forest in the summer of 1870, by Mr. Gerrard of Lyndhurst, and sold by him to the Rev. Windsor Hambrough, see "Entomologist," Vol. V., p. 351. This was shown at the National Entomological Exhibition, held at the Westminster Aquarium, in 1878, and recorded in the "Entomologist," Vol. XI., p. 162, with this comment, "upon its correctness there seems some doubt."

Another is recorded on p. 83, Vol. VIII., of the same magazine, as being taken by Mr. Gregson, in August, 1871, at the Devil's Gallop, near Windermere. A more extensive capture of the species was said to have been made in 1874, in a wild gorge, in Kent, between Wye and Ashford, and recorded in the "Entomologist," Vol. VII., but the whole tale seems to have been a fabrication, see "Young Naturalist," Vol. I., p. 395.

ARGYNNIS LATHONIA.

Queen of Spain Fritillary.

LATONA, Linn. Lato'na, the mother of Apollo and Diana. The name is variously spelt—Latona, Latonia, Lathona, and Lathonia.

This is the rarest as well as the most beautiful of our British Fritillaries. The colouring of the upperside resembles that of the rest of the genus, being fulvous spotted with black. Underneath, the fore-wings have nearly the same markings as those on the upper surface, but near the tip is a group of silver spots. The hind-wings are buff, varied with reddish brown, with numerous silver patches of different sizes and shapes, and of which there are about fourteen between the base of the wings and a row of seven dark brown eyed spots with silver pupils, between each of which and the margin of the wing is a large silvery patch resembling mother-of-pearl. It will be observed that the form of the front wings differs from the rest of the Fritillaries, the outer margin being concave in its outline. The inner corner of the hind-wings also is more sharply angular.

The width across the wings is from an inch to an inch and a half.

There does not appear to be any variation to speak of in English caught specimens; but on the Continent it varies much in size, and the black spots on the upper surface are larger, or smaller in different specimens. The Indian form is called *Issæa*, but it scarcely differs from the type. The silver spots on the underside also vary in size, and sometimes are so large that they become confluent. This is the variety *Valdensis* of Esper. A beautiful specimen of this variety from Norway, the upper-side being likewise melanic, is figured in the "Entomologist," Vol. XIV., p. 25.

The egg, caterpillar, and chrysalis have never been found in this country.

The caterpillar is blackish grey, with a whitish stripe down the back, and two brownish yellow lateral lines. The spines are short and of a pale yellow. It feeds on *Viola tricolor*.

The chrysalis is anteriorly dull brown, posteriorly greenish, sprinkled with gold and silver spots, and has a white streak at the end of the wing-cases (J. F. Stephens "Illustrations.")

The butterfly is rather later in emerging than the rest of the Fritillaries, not appearing before August, and continuing on the wing till quite late in the year, several being recorded in October, and one as late as the 4th of November.

In Petiver's time it was not very rare in Gamlingay Wood, Cambridgeshire, in May; but all the recently recorded British examples have occurred in the autumn.

In Kirby's "European Butterflies" it is also said to occur in May and June; whence it would appear to be double-brooded. Godart, however, tells us that the last autumnal specimens hibernate and re-appear in the spring—an anomalous event amongst the Fritillaries, thereby approximating in habits to the *Vanessæ*.

The caterpillars are said to hibernate small, as do others of the genus, and to feed up in the spring.

Argynnis lathonia is widely distributed in Europe, Northern and Western Asia to the Himalayas, and North Africa. It does not extend to the Polar regions but is common in Sweden and Norway. It frequents lanes and roads in woods, and its flight resembles that of *Hipparchia megæra*, but is more rapid. It sometimes settles on the pathway, and has been seen in clover fields. In England it is a very scarce species, appearing at uncertain intervals, and generally in places on the coast of Kent, leading us to the conclusion that, like *Pieris daphidice*, it is but an occasional visitor. A stray specimen was taken near York, and another near Scarborough, which are the most northerly records for Britain. A single specimen was taken on August 10th, 1864, at Killarney, in Ireland.

The first record we have of its being a British species is in John Ray's "Historia Insectorum," published in 1710, as follows: "Papilio Rigensis aureus minor, maculis argenteis subtus, pubelle notatus. The Lesser Silver-spotted Fritillary. Species est pulchra, et ab aliis congeneribus satis distincta. A. D. David Kreig Riga transmissam primò accepit D. Petiver, postea etiam à D. Vernon, D. Antrobus, et aliis circa Cantabrigiam inventa est."

James Petiver, in his "Papilionum Britanniae," records it as being observed about Cambridge.

Moses Harris, in his "Aurelian's Pocket Companion, 1775, names it the Queen of Spain, and records it as occurring in Gamling Gay Wood, near Cambridge.

Lewin, in his "Insects of Great Britain," 1795, writes: "With the natural history of this rare English insect we are not in the least acquainted, and we have only two or three instances of the butterfly's being taken in this country. Mr. Honey, of the Borough, has a good specimen in his extensive collection of English insects, taken by him in his garden in the month of August. The figure of the caterpillar, with the description, I have added from the elegant and correct work of Sepp: 'The eggs of this butterfly are ribbed and oblong; the broadest end being fast glued to the plant on which it is laid. The female lays them not in clusters, but separate; and it is remarkable that she lays only in the sun, ceasing whenever she is by any means

shaded. From the eggs, which the butterfly began to lay on the 10th of June, the first caterpillars appeared on the 18th. They were of a yellowish grey colour, with black heads; and their bodies were covered with fine short hairs. On the 27th, they changed their skins for the first time, and then acquired spines, beset with long hairs; the colour of the caterpillars was now nearly black, with a light stripe on the back. On the 7th of July they changed their skins a second time, on the 15th a third time, and on the 24th or 25th the fourth and last time. The spines, which after the first change appeared with fine and long hairs, acquired their stiff ones after the last change. In a few days after the fourth change, the caterpillars had attained their full growth.’”

Haworth, in his “*Lepidoptera Britannica*, 1803, writes: “*Habitat Imago prope Cantabrigiam, etiam prope Londinum, et etiam prope Wisbeach, f. Mai. : Sept. sed rarissime.*”

In the Preface to the above work, Haworth also writes: “Since the body of this work was printed, my friend the Rev. Dr. Abbott, of Bedford, has informed me that he took in May last, near Clapham Park Wood, in Bedfordshire, a specimen of *Papilio podalirius* in the winged state; and that he also took in June last, in White Wood near Gamlingay, Cambridgeshire, the *Papilio daplidice* (in a faded state), and likewise *Papilio lathonia*. These are three extremely interesting species, and there is not a British specimen of any of them now extant, except the above. (All now belong to J. C. Dale.)

“As to the Gamlingay *Lathonia* (the Queen of Spain Fritillary), it is, in my estimation, the most interesting insect we have in the whole genus; because it is not only extremely rare and beautiful, but, if it is the same as our London *Lathonia*, it is likewise double-brooded, and that in a very singular and unusual manner: that is, a brood of it flies in May at Gamlingay, but not near London; and another separate brood of it flies in September near London, but not at Gamlingay; and never contrarywise. And this is still further extraordinary, as no other Fritillary we possess in Great Britain, was ever known to breed more than once in the same season, and that in the months of May, June, or July.

“*Lathonia* was not very rare in Gamlingay Wood, Cambridgeshire, in the days of Petiver. It has also been taken at Wisbeach, and my friend, Dr. F. Skrimshire, assures me he has seen a specimen of it in some picture, which was taken many years since in his father’s garden at that place.

“My friend Mr. Hatchett, of Kingsland, knew an old London Aurelian, of the name of Shelfred (nume inter beatos), who was so much attached to Aurelian amusements, and so much enamoured of the beautiful and rare *Lathonia*, that he absolutely determined upon, and accompanied by his daughter, successfully performed (in postchaises) a journey to Gamlingay, in

pursuit of that charming *Papilio*, which he had the good fortune to meet with and secure; but his specimens are not now extant. Our London *Iathonia* is infinitely more rare than the Gamlingay one; there have only been seen five individuals of it, all in different and distant years, and all in the month of September. Every one of these I have examined; but the Gamlingay *Iathonia* never."

Stephens, in his "Illustrations of British Entomology," 1828, writes, "The effulgent metallic brilliancy of the silver spots which adorn the posterior wings of this beautiful insect beneath, renders it pre-eminently conspicuous in our collections; and its peculiar rarity contributes to the value of its acquisition. Previously to the year 1818, few cabinets possessed even a single specimen; and from the very few known instances of its capture (six only according to Mr. Haworth,) there is reason to believe that some of the specimens at that time placed in collections were foreign; but in the above remarkable year for the appearance of certain papilionaceous insects, this species occurred simultaneously in several, and very distant parts, having been taken in August, by Mr. Haworth, at Halvergate, in Norfolk; by Mr. Vigers, in Battersea fields; by myself at Dover, and during that and the following month near Colchester; Birch Wood, Kent; and Hertford, in plenty by others. At the latter place I saw several specimens, but was not fortunate enough to secure any. In Petiver's time it was not very rare in Gamlingay Wood, Cambridgeshire, in May; but all the recently recorded British examples have occurred towards the autumn, a fact which is apparently corroborated by the captures of 1818. The first specimen (a female) I caught on the 12th of August, sporting at the foot of Shakspeare's Cliff, was in a very faded state, and had evidently been "winging its way" for many weeks; a pair which I took on the 14th, in the Castle meadow, Dover, were also in a faded condition, whereas the specimens taken near Birch Wood, at the end of September, were remarkably fine."

Newman, in his "British Butterflies," 1871, writes: "This common Continental species has always been considered, and still remains, a great rarity in this country; the English localities are rather numerous, but the number of specimens is very small; the maritime position of most of the localities suggests the idea of the specimens having migrated from the Continent: Dover, Ramsgate, Folkestone, Ventnor, &c., seem to support this conclusion; while others, such, for instance, as the celebrated locality in Birch Wood, are so truly inland that we cannot hesitate to believe that the specimens have been bred on the spot where they were captured. I think we may conclude that, like many of our resident birds, such as the goldfinch or skylark, of which thousands of dozens are annually captured on their arrival on our

southern wastes, that accession to the number of *Lathonias* take place every year. Mr. Birchall informs me 'that a single specimen was taken at Killarney, in Ireland, on the 10th of August, 1864, in a lane leading from Muckcross to Mangerton, near a limestone quarry on the left of the road'—a very important and interesting fact, since no doubt can now be entertained of the species existing in the Killarney district in a perfectly natural state, although the constant humidity of the atmosphere may interfere with its appearance on the wing. From Scotland I have no report of its occurrence."

Dr. Knaggs, in his "List of the Macro-Lepidoptera occurring in the neighbourhood of Folkestone," 1870, writes of *Lathonia*: "Two or three examples have been secured in the Warren. It used not to be scarce in some seasons in lucerne fields, at the back of Dover Castle."

Messrs. C. J. and James Paget, in their "Sketch of the Natural History of Yarmouth," 1834, writes, "*Lathonia*—a single specimen taken this year, August 2nd, by Capt. Chawner, near Caistor rails."

In the "Zoologist," Vol. II, both *Daplidice* and *Lathonia* are recorded as being captured in Roseberry Wood, near Exeter, by Mr. Dawson, in the year 1836, and were by him presented to Mr. Thomas Leighton.

In 1839, twelve specimens were captured by Mr. Pierce, in woods in the parish of Shoreham, and recorded in the "Zoologist," Vol. III, p. 945.

In 1842, a couple were taken by Mr. George, in Suffolk, on the 3rd September.

In 1846, two good specimens were taken in October, at Harleston, near Norwich; and three near Dover. In that year *Antiopa* was much commoner than usual, as also were the rare *Sphinges*.

In 1851, a couple were taken on the race course near Ipswich, and two or three pairs at Jagger, near Colchester.

In 1852, a couple were taken by Mr. Reeks, at Swanage, in Dorsetshire.

In 1854, the Rev. W. H. Hawker recorded in the "Zoologist," Vol. XIII, the capture of six specimens by himself in the Forest of Bere, Kent.

In 1856, one is recorded in the "Intelligencer" as being taken near Chesham, Bucks.

None appear to have been met again till 1864, when one was taken near Ramsgate, on the 17th of September; and another at Killarney, in Ireland.

In 1865, a specimen was taken at Blandford, in Dorsetshire (twenty miles from the sea), and others at Dover and Folkestone, in Kent, and also in Norfolk, Essex, and the Isle of Wight. No less than five were taken in the Isle of Wight, at Sandown and Ventnor, on the 20th, 21st, and 24th of October, and the 4th of November.

In 1868, the great year for *Colias hyale*, no less than thirty specimens of

Lathonia were taken in Kent, Suffolk, and Essex, and one as far North as Scarborough, in Yorkshire. That year had a summer almost unprecedented for the duration and intensity of its heat, and which was followed by an exceedingly mild autumn. *Pieris daplidice* also occurred that year in Kent.

None appear to have been seen in 1869, and but one in 1870, and one in 1871.

In 1872, there were no less than nine of *Lathonia*, four of *Daplidice*, and two of *Antiopa*, taken at Dover by different persons, all three species being unusually common that year. Specimens of *Lathonia* were captured besides at Folkstone, Ramsgate, Canterbury, Felixstowe, Ipswich, Yarmouth, Deal, and Ventnor, in the Isle of Wight. It was also common in Jersey. Mr. Poingdestre, in recording it in the "Entomologist," Vol. VI., p. 235, writes, "I took *Lathonia* rather plentifully on the 1st of April and the 1st of June, on some sandhills near the sea shore: few were on the wing during July and August, but in the middle of September they again appeared. The April specimens were evidently just out of the chrysalis: they were smaller than the autumnal ones."

In 1876, one was taken at Hastings, in Sussex, on the 14th of August.

None appear to have been met with again till 1880, when eighteen specimens were recorded by Mr. Sydney Webb, in the "Entomologist" for that year, as being taken in and near Dover.

In 1882, twenty-five were recorded by Mr. Sabine, in the "Entomologist" for that year, as being likewise taken in and near Dover: the Queen of Spain thus proving herself a brilliant exception to the general entomological poverty of that year.

In 1883, six specimens were recorded by Mr. Sabine, in the "Entomologist" for that year, as being taken in the Dover district; and a couple more were taken in a clover field near Salisbury, by Mr. Penruddocke.

In 1884, one was taken near Canterbury, in August, and another at Ashford.

In 1885, one was taken on the Brighton racecourse, on the 3rd of August, and another at Kingsdown, near Deal: but none appear to have occurred in either 1886 or 1887.

It will thus be seen that the most favourable years, for the Queen of Spain, were those of 1818, 1839, 1865, 1868, 1872, 1880, and 1882.

ARGYNNIS EUPHROSYNE.

Light Pearl-bordered Fritillary.

EUPHROSYNE, Linn. Euphros'ynè, one of the Graces.

This Fritillary expands in the width of the wings from one inch and three quarters to nearly a couple of inches. On the upperside they are fulvous, spotted and marked with black. On the underside, the hind-wings are of a dull yellow or ochreous, with brick-red blotches, a row of silver semi-circular spots at the hind margin, a large oblong silver spot in the centre of the wing, and a smaller one at the base.

It varies similarly to others of the genus. The black spots become larger until they coalesce, sometimes forming bands, &c.

A very curious variety is in the collection of Mr. Vaughan. It is of the ordinary form in all respects, except that the spots on the upperside are silvery or rather leaden in colour, instead of being black as usual.

A specimen in Mr. Brigg's cabinet has the base of the hind-wings entirely black: it was captured at Folkstone, in 1876. In Mr. Bond's collections are specimens of a buff, orange, or almost white ground colour.

Stephens, in his "Illustrations," gives the following.

Var. *b*. With the marginal fascia of silvery spots on the posterior wings wanting.

Var. *c*. With the basal half of all the wings above, black spotted with fulvous; with large black spots on the anterior wings beneath.

Var. *d*. With the ground colour of all the wings of a pale fulvous yellow, both above and below. (This is *Euphrasia*, Haw. M.S.S.)

Var. *e*. Wings above pale fulvous, irregularly spotted with black: anterior beneath pale varied with yellowish and ferruginous towards the tips, with some obsolete black or dusky spots on the disc: posterior wings variegated with ferruginous, yellow, and green, with the pupil of the ocellus very large, the discoidal silvery spot produced to the hinder margin, and the usual marginal spots lengthened inwardly; the usual fasciæ are obliterated, but the silvery spot at the base is somewhat apparent.

The latter is the *Thalia* of the old "Entomological Transactions," published in 1812; but the *Thalia* of the continental writers is referred by Ochsenheimer and Godert to *Selene*. However, it is the *Thalia* of Hubner. Mr. Haworth in recording it writes: "I have an English specimen of this rare and beautiful insect; which is, perhaps, a very extraordinary variety only of *P. euphrosyne*."

Thalia, Hub., occurs more frequently in Sweden and Norway; and another named var. *Fingal*, Herbst., is also found in the more northerly parts of

Europe. This, like many other boreal specimens, is smaller and darker than the type, the spots coalescing into bands.

The egg is of a blunt conical shape, with its lower surface, which adheres to the leaf, flattened, its sides are ribbed; at first it is of a dull greenish yellow colour, but turns afterwards to a brown. Towards the end of June the caterpillar is hatched, being then of a pale greenish tint, but after the first moult it becomes of a browner green, and about the middle of July it attaches itself to the plant and ceases to feed. (W. Buckler.)

The caterpillar, when full-grown, is black, with bluish white stripes on the sides, and a few white spots on the back. The spines on the back are yellow, with black tips, head and legs black, claspers dull. It feeds on the leaves of the dog violet (*Viola canina*), but is rarely met with, and Mr. G. F. Matthew informed Mr. Buckler that they are seldom seen on their food-plant, but generally on a dead leaf in its immediate neighbourhood, or a twig above it. Mr. Buckler records its pace when walking as being very rapid; and that sometimes it fed for a while on the dog violet leaves, and that it sometimes rested quite still basking in the rays of the sun; when these were withdrawn it retired to the underside of a leaf and there remained, apparently without motion, till the hour (viz.: 2 p.m.) of the next day which brought the sun round to the window in which its cage was placed, and then at once it came forth and walked actively about, feeding and basking as before. On May 5th it had changed to a chrysalis, suspended by the tail to a circular mass of silk spun upon the side of the glass cylinder, hanging about three-quarters of an inch from the earth.

The chrysalis, five-eighths of an inch in length, is moderately stout and rather sharply pointed, much curved in outline, and warty: it is grey brown in colour, with a few dots of a paler shade; the wing cases are long in proportion and dull brown in tint.

The butterfly emerges at the end of April (Lewin saw it flying once as early as the 12th), but more frequently in May, and continues on the wing during the earlier part of June. The caterpillar is hatched at the end of June or beginning of July, but does not as a rule feed up till spring in this country. Sometimes, however, it does so, and the butterfly appears in September, but the instances are few and far between.

M. Vandover has published in the "Ann Soc, Linn.," Paris, September, 1827, some curious observations upon the lethargy of the caterpillars of *Dia* and *Euphrosyne*. Some caterpillars reared from eggs of the latter, when about a month old, fell into a lethargic state at the end of June, in which they remained until the following spring: a few, however, revived in August, and became butterflies the same autumn. The same experiment made upon

the caterpillars of *Dia* produced the same result. Hence appears the reason why those butterflies, and *Selene* likewise, are so common in spring and early summer, whilst so very few are found in autumn.

Argynnis Euphrosyne is one of the commonest of the butterflies attached to woods, and occurs all over Europe, except the extreme south, such as Spain and Portugal, Southern Italy, Sicily, &c., and is also found in Northern and Western Asia. It has never been recorded from Ireland, but is one of the very commonest of wood butterflies throughout England. It swarms in the London district, as in Darenth and Birch Woods, and is equally abundant in Northumberland and Durham. It seems to be more common in the northern than in the southern parts of Scotland, especially in Rosshire, but does not occur in Caithness. It is not a common species in Perthshire, but is found in the Scone Woods and at the Bridge of Allan.

The first record we have of it as being a British species is in Ray's "Historia Insectorum," published in 1710. Ray names it the April Fritillary, and after describing it, ends with these words: "Hanc speciem mihi primum ostendit, D. Dale."

Petiver, in his "Papilionum Britannica Icones," published in 1717, writes, "April Fritillary with few spots. This has but one oval silver spot in the midst of the wings beneath. Frequent in Cain Wood."

Lewin, in his "Insects of Great Britain," 1795, writes, "This butterfly is very plentiful in all our woods, and is the first of the Fritillaries that makes its appearance on the wing in the spring of the year, I have seen it flying as early as the 12th of April. The caterpillar is unknown."

ARGYNNIS SELENE.

Dark Pearl-bordered Fritillary.

SELENE, Fab. Selènè, the Greek name for Luna, the Moon.

This Fritillary expands in the width of the wings from an inch and a half to a couple of inches. On the upperside they are fulvous spotted and marked with black. On the underside the hind-wings are of a dull yellow or ochreous with dark red blotches, a row of silver semi-circular spots along the hind-margin, and several other silver spots about the centre and base of the wing. It is liable to considerable variation like the last species, specimens occurring of a buff, orange, or almost a white ground colour. A very beautiful variety, in Mr. Webb's collection, is figured in Mr. Mosley's "Illustrations of Varieties of Lepidoptera." The forewing of this specimen has two rows of small spots at the hind-margin, and only two others on the costa behind the centre, while the hindwing is all black at the base, and the wing rays

are as black streaks to the margin. It is as if nearly all the black of the forewing had been transferred to the hindwing. This specimen also varies much on the underside, which is streaked with red, yellow, and silver, in lieu of the usual spots. It was taken near Ipswich in 1875. The Lapland variety *Hela*, Staud., is smaller and darker than the type. Four others have been named, viz.: *Thalia*, Esp.; *Pales*, Bergst.; *Marphisa*, Herbst.; and *Rinaldus*, Herbst.

The egg is of a dumpy, blunt, sugar-loaf shape, with a thin, soft, glistening shell, which is ribbed with about eighteen ribs, and transversely reticulated: it is at first of a subdued pale yellow, but afterwards turns to more of drab.

The caterpillar when newly hatched is of a pale olive, with a shining black head. When full-grown it is a velvety smoky pink, and has a dark brown dorsal line, which throughout its course expands and contracts twice in each segment: in front of each sub-dorsal spine, and partially enclosing it, is a velvety black spot delicately edged with white, while behind each spine is a blackish interrupted streak. The spiracles are black, the forelegs pale pink with blackish brown tips, and the anterior legs are black and shining. It feeds on the leaves of the dog violet (*Viola canina*), and hibernates when small. Unlike its congener *Euphrosyne*, the caterpillar of *Selene* has an aversion to the rays of the sun, and does not at any stage care to expose itself to their direct influence, but reposes either on the undersides of the leaves, or else on the stems while shaded more or less by the leaves, and feeds while young, on the youngest and most tender leaves of the violet. (W. Buckler. "Larvæ of British Lepidoptera.")

The chrysalis is suspended head downwards; it is about half-an-inch in length, thick, and obtuse in front, and much curved in outline. It is brown in colour, with metallic spots and black spiracles: the ground colour is most delicately reticulated with blackish brown.

The butterfly emerges at the end of May, but more frequently in the beginning of June, and continues on the wing for about a month. When the flight of *Euphrosyne* is nearly over, then *Selene* appears upon the scene; but it is only for a short time the two bear each other company. The caterpillar is hatched in July, but does not, as a rule, feed up till spring in this country. Sometimes, however, it does so, and the butterfly appears in autumn; small and apparently stunted specimens. Like most others of the genus, *Selene* is a wood-frequenting species, and occurs all over Europe, except the southern parts such as Spain and Portugal, Southern Italy, Greece, &c., and is also found in Northern and Western Asia. It has never been recorded from Ireland, but is far commoner in Scotland than *Euphrosyne*, occurring as far

north as Rosshire, and is more widely distributed. Dr. Buchanan White observes it is a common species throughout Perthshire in marshy places, in woods, and on the hill sides, holding the same place as *Euphrosyne* does in England.

The first record we have of it as being a British species is in Ray's "Historia Insectorum," published in 1710, under the name of the May Fritillary.

Petiver, in his "Papilionum Britannica Icones," published in 1717, writes, "Frequent in Cain Wood."

Lewin, in his "Insects of Great Britain," 1795, writes, "*Euphrasia*, Linn. Small Pearl-bordered Fritillary. This butterfly is to be taken in woods about the middle of May, flying with the above; and indeed they are so like each other, that a person not well acquainted with them would suppose them to be the same species. The difference of the markings on the upperside is scarcely discernable: however, the under-wing on the underside is distinctly different, so that there is not in reality any doubt of their being distinct species. The caterpillar is unknown. These are common insects, and both species of flies may be easily taken, when feeding on the different flowers that bloom at the time they are on the wing."

Newman, in his "British Butterflies," 1871, writes, "In the Kentish woods, I have always found that this butterfly makes its appearance from ten to twenty days later than *Euphrosyne*. I have taken it on the 1st of June, but it is more abundant about the 8th or 10th. Dorsetshire: Glanvilles Wootton (but rare of late years) Puby, &c.—J. C. Dale. Essex: Colchester, but not so common now as formerly.—W. H. Harwood."

In June, 1887 and 1888, *Selene* occurred in profusion in the Glanvilles Wootton copses, and in 1887, I took a fresh specimen on the 15th of August, which is about half the usual size.

In 1818, B. Standish met with one or two in Middlesex, during the month of September.

An allied species, *Argynnis dia*, Linn., is figured in Loudon's "Magazine of Natural History," Vol. V. p. 751, published in 1832, by the Rev. W. Bree, who writes, "Mr. Weaver possesses two specimens, both of which were taken in Sutton Park, Birmingham; one about ten years ago, the other not more than five or six. It differs from *Selene* in being rather smaller, and having the black spots and characters on the upperside of both pair of wings larger and stronger, so that the whole assumes a darker appearance than that insect; but the principal difference consists in the underside of the posterior wings, which are of a brownish purple, interspersed with darker markings of the same colour, and numerous irregular semi-metallic spots; a row of which

borders the posterior margin." The chief difference is the straight border to the upperside of the posterior wings.

The caterpillar, like those of the rest of the genus, feeds on the common violet.

It has also been reported as being taken in Alderly Park, Cheshire, by Mr. Stanley (but the specimens appear to have been varieties of *Selene*), and a female as lately as 1872, in Worcester Park, Surrey.—See "Entomologist," Vol. IX., p. 69.

Argynnis dia is common in spring and autumn, in woods, throughout Central and Southern Europe, and also in Western Asia.

GENUS XX. MELITÆA.

Fabricius.

MELITÆA, a town in Thessaly. Sodoffsky proposes *Melinæa*, a surname of Venus, from Mel. honey.

This genus is difficult to characterise in the perfect state, so as to readily distinguish it from the preceding; but there is one important distinctive character which has been pointed out by Drs. Adolfe and Otto Spyer, viz., that the tarsi of the middle and posterior pair of legs are not spiny on the upper surface, whilst they are so invariably in *Argynnis*. The hind-wings also have no silvery spots. The caterpillars differ from those of *Argynnis* in being shorter in proportion to their thickness, and instead of spines are furnished with short fleshy tubercles beset with short bristles. They feed on plantain and scabious, and when young, live in societies under tents of silk.

Melitæa does not contain half as many species as *Argynnis*, only about forty being enumerated. Like it, they inhabit for the most part northern and temperate climes. Many of them are excessively variable, and some species seem to run so much into others, that their discrimination is often a matter of difficulty; which the uniform character of their markings does not tend to simplify. Only three species are British, but though they are variable enough, there is no difficulty in distinguishing them. An American species, *Tharos*, sometimes swarms in countless thousands on Goat Island, in the midst of the falls of Niagara.

MELITÆA CIXIA.

The Glanville Pritillary.

CIXIA, Linn. Cinxia, a surname of Juno, connected with cingulus, a girdle.

On the upperside, the wings are of a deep fulvous, tessellated with brownish black, and with a row of black spots on the hind-wings. On the underside, the hind-wings are of a pale straw colour, with two fulvous bands edged with black, and have several rows of small black spots. The width across the wings is from one inch and nine lines to a couple of inches.

This Fritillary is most subject to variation on the underside of the hind-wing by the enlargement or diminution of the black spots. In some specimens they are like larger black blotches or streaks, while in others they are almost wanting, especially on the central pale band. In others, the upperside varies, like the preceding genus, by the enlargement of the black spots or the suffusion of the wing with black, but the variation of the underside is much more frequent. Two varieties, occurring in Sweden, have been named *Fulla* and *Delia*.

The egg appears to be undescribed.

The caterpillar is intensely black, being very slightly spotted with white, and has a red band and claspers, the legs being black. Each segment has eight warts, from which proceed tufts of short bristly black hairs.

The chrysalis is short and stout, of a very dark colour and almost smooth.

The butterfly emerges during May and June, sometimes being quite out at the beginning of the former month. The eggs are laid in batches during May and June on the leaves of the food-plant, the narrow-leaved plantain (*Plantago lanceolata*), and the caterpillars are hatched towards the end of July or in August. They feed rather slowly during the autumn months, and as the cold weather approaches, they spin a kind of tent or covering of silk among the grass stems and plantain leaves, in which they pass the winter. This tent is very compact, and almost of a globular form, the caterpillars in each mass varying considerably in number. In some there are fifty or sixty; in others not more than a dozen. The web is very ingeniously constructed, the blades of grass, as well as the leaves and flowering stems of the plantain being interwoven, and thus rendering the mass firm and compact. The caterpillars when examined in the winter are about a third of an inch long, and directly they are disturbed roll up into little balls. Early in the spring they leave their winter quarters and feed up rapidly. At the end of April they attach themselves by the tail to plantain stems, almost close to the ground, and change into chrysalides.

Melitæa cinxia is well spread over Europe, being only absent from the polar regions. It occurs also in Asia Minor and Siberia. In the British Isles it occurs in but few localities, and all of them on the Southern coast. It is or was abundant in the Isle of Wight, where it was discovered by Mr. E. Newman, on the Undercliff, near Sandown, in 1824. It also occurred at

Ventnor, Newport, Carisbrook Castle, Blackgang Chine, and Freshwater, in the Isle of Wight; near Brokenhurst, in the New Forest; on the cliffs near St. Margaret's Bay, Kent; and very rarely in the neighbourhood of Great Bedwyn and Sarum, Wiltshire. It also formerly occurred in Yorkshire and Lincolnshire. In the Channel Islands it is most abundant, occurring all round the coasts of Guernsey and Jersey; but appears to have almost disappeared from England, a few only having been taken of recent years in the Isle of Wight.

The first record we have of it as being a British species, is in Petiver's "*Gazophylacium Naturæ et. Artis*," published in 1702. It is there recorded as being found in Lincolnshire, and near London in a wood at Dulwich.

Ray, in his "*Historia Insectorum*," published in 1710, calls it "*Papilio Fritillarius Lincolniensis fascius subtus pallidis*," and after describing it, winds up with "*Hujus capiam D. Dale nobis fecit. Nimis fretasse prolixè hanc speciem descripsus*."

Wilkes, in his "*English Moths and Butterflies*," 1773, writes, "*The Plantain Fritillary Butterfly. The caterpillar hereof feeds on plantain, clover, and grass, changes to a chrysalis, within a web of its own spinning, upon the surface of the ground, at the beginning of May, and the fly appears fourteen days after. The caterpillars are sociable, and feed together. They appear of a very timorous nature, for if you move the food on which they are, they immediately quit their hold and fall to the ground, and there remain in a curled up form till such time they think the danger over. The butterfly is swift in flight, but may be taken if diligently attended, in fields of hay-grass, at the time above mentioned.*"

Moses Harris, in his "*Aurelian*," 1779, writes, "*The fly took its name from the ingenious Lady Glanville, whose memory had like to have suffered for her curiosity. Some relations that were disappointed by her will attempted to set it aside by acts of lunacy, for they suggested that none but those who were deprived of their senses would go in pursuit of butterflies. Her relations and legatees subpoenaed Dr. Sloan, founder of the British Museum, and Mr. John Ray to support her character. The last named went to Exeter, and at the trial satisfied the judge and jury of the lady's laudable inquiry into the wonderful works of the creation, and established her Will. She not only made the study of insects part of her amusement, but was as curious in her garden, and raised an Iris from the seed, which is known to this day, by the name of Miss Glanville's Flaming Iris.*"

Lewin, in his "*Insects of Great Britain*," 1795, writes, "*This is not a very common butterfly, but may be met with in meadows and fields of grass, in June.*"

Donovan, in his "Natural History of British Insects," Vol. VII, published in 1798, writes, "This is the rarest of the British Fritillary Butterflies, if we except *Papilio lathonia*, the Queen of Spain. The flies appear in May. The caterpillars are black, beset with spines and tufts of the same colour: the sides are marked with a double row of white spots, the feet red."

Stephens, in his "Illustrations of British Entomology," 1828, writes, "This is a very local species, and is found in meadows by the sides of woods: in Wilkes' time it was not uncommon in Tottenham Woods; recently the places where it has been chiefly observed have been near Ryde and the Sanddroch Hotel, Isle of Wight; in the latter place in plenty; also at Birch Wood, and near Dartford and Dover, and in a wood near Bedford. I believe it has been found in Yorkshire; and from Ray, it would appear to have been abundant in Lincolnshire in his time. It generally flies in June."

Curtis, in his "British Entomology," 1832, writes: "Rare in meadows on the borders of woods, from the middle of June to the beginning of July. Tottenham Wood, Wilkes; Lincolnshire, Ray and Petiver; Yorkshire, Dulwich, Birch Wood, and near Dartford; near Dover, Mr. Leplastria; Ryde, Isle of Wight, Mr. Sparshall; near the Sandwich Hotel and Undercliff, at the back of the island, Mr. Newman and Mr. Waring."

The Rev. F. O. Morris, in his "History of British Butterflies," 1853, writes: "This butterfly is a very local one, so that its capture must be regarded as a great fact in the experience of by far the greater number of entomologists. J. W. Lukis informs me that this extremely interesting insect is taken, though very rarely, in the neighbourhood of Great Bedwryn and Sarum, Wiltshire. It seems to be most plentiful near Ryde and other places in the Isle of Wight, on the grassy sides of the grassy glens which run down to the sea shore."

In the "Zoologist," for 1846, the Rev. J. F. Dawson gives the following interesting account of the habits of *Melitaea cinxia* in the Isle of Wight. "As this Fritillary is rare in almost every part of the kingdom, some account of its favourite habits and haunts may not prove uninteresting. It cannot be accounted by any means common here, being confined to a few localities only, though where it does occur, it is in general to be found in some abundance. It is not to be expected in cultivated districts, but breeds on steep and broken declivities near the coast, which the scythe or the plough never as yet have invaded; and in such spots it may be met with sooner or later in May, according to the season. Near Sandown, on the side of the cliff, there is one of these broken declivities, occasioned by some former landslip, covered with herbage, which slopes down to the beach. A path-way leads to the base. On the 9th of May, 1844, a hot sunny day, each side of this path-way was

completely carpeted with a profusion of the yellow flowers of *Anthyllis vulneraria*, when I visited the spot; and these flowers were the resort of an abundance of these Fritillaries, which fluttered about them, or rested on their corollas, expanding and sunning their wings, and presenting a most charming picture of entomological loveliness. The great abundance of the narrow-leaved plantain, which also grows there, affords food for their larvæ. The spring of last year, on the other hand, was so very backward, that on visiting that locality at a date some fortnight later than the above, so far from either flowers or butterflies being visible, the larvæ were still feeding, and I could discover but few chrysalides. These latter are found adhering, just above the surface of the ground, to the knotted stems of the plantain, which here consists of aged plants, each with but a few stunted leaves; and occasionally on the underside of large stones, which have fallen from the cliff, and they are suspended and partly surrounded in the latter case with a fine web. They are also generally to be found in pairs. The caterpillars evidently prefer these stunted plants, for at the base of the declivity, where the plantain grows luxuriantly, not one is to be seen. They are black and spiny, with red heads and legs: being hatched in August, they pass the winter in societies, under a kind of tent, formed by a compact web, brought round and over the stems of grasses. I have found several of these societies on the 27th of August, the individuals which composed them being about a quarter of an inch long, rolled up like little balls. All these societies occurred at the base of the declivity, where the herbage grows most luxuriantly; and when the caterpillars have obtained sufficient strength in the spring, they are invariably seen ascending the higher parts of the slope. And herein I imagine that I recognize a beautiful instance of natural instinct, both in the butterfly and caterpillar: the former deposits its eggs low down the declivity, where the young brood may rest most securely sheltered, and least exposed to the wintry storm, but when the caterpillars are sufficiently advanced in growth, they ascend to the higher parts of the steep to feed and undergo their transformation; were the chrysalis formed below they probably would have too much moisture and too little sun; whereas by being formed higher up they have a sufficiency of both to bring them to maturity."

This butterfly is single brooded; but there is a succession of them, varying in duration according to the season. The earliest date on which I have met with it is May 1st, the latest in July; but in the latter case the specimens were bred in captivity. I never remember to have seen it so late in the state of liberty, not later indeed than the middle of June here. They are very difficult to rear; and those that I have bred, are not only disclosed much later than in the state of freedom, but are not nearly so fine and perfect.

They in general fly slowly and peacefully, except when alarmed, gliding gently from flower to flower. I have taken as many as two dozen without moving from the spot where I stood, as they successively visited the stems of the grasses round me.

This Fritillary was much less plentiful last season than heretofore; and in some of its former haunts has quite disappeared. It has many foes; for besides the march of improvement in cultivation which gradually invades its haunts, the same natural causes which promote its abundance, also multiply its enemies. Two necrophagous beetles, *Silpha obscura* and *tristis* destroy the larvæ, and a large ground spider, very numerous in the spots which it frequents, feeds on the perfect insect; it lies in wait till the butterfly alights upon the low plants, or on the ground, then rushing forward, seizes it by the neck, and holds it captive with such tenacity, that both insects may almost be pulled in pieces ere it will relax its grasp."

Newman, in his "British Butterflies," writes, "I had the pleasure in 1824, in company with my friends, George Waring, of Bristol, and Waring Kidd, Godalming, of discovering the now celebrated locality of Undercliff, Isle of Wight. We found the caterpillars, chrysalides, and butterflies equally abundant at the same time. With a feeling of triumph I recorded the discovery in the pages of "Loudon's Magazine of Natural History," then in the zenith of its glory, now a mere memory of the past."

On June 8th, 1855, the Glanville Fritillary was very common at Blackgang Chine.

In 1865, several were found on the Undercliff at Folkestone, by Mr. Briggs, and recorded in the "Entomologist's Monthly Magazine," Vol. II: however, Dr. Knaggs, in "List of the Macro Lepidoptera, occurring in the neighbourhood of Folkestone," published in 1870, records it as "not being observed of late years.

In the "Entomologist," Vol. VI., Mr. Luff writes, "*Melitæa cinxia* is abundant both in Guernsey and Sark. The earliest date I have of its appearance is May 8th, 1870. In 1872, I did not observe one on the wing until the 27th of May, and then they were nothing like the abundance of the previous seasons. I noticed a couple of battered females on the wing as late as the 26th of July. They are to be met with all round the southern coast of Guernsey, from Fermain Bay to Pleinmont Point, but are never found far from the sea coast."

MELITÆA ATHALIA.

The Heath Fitillary.

ATHALIA, Esp. Athali'a, the daughter of Omai, King of Israel, and wife of Jehoram, King of Judah—heroine of Racine's tragedy "Athalie."

She is erroneously recorded in the "Accentuated list of the British Lepidoptera," published in 1858, as being the daughter of Ahab.

Like the last species, the wings on the upperside, are of a deep fulvous tessellated with brownish black, but the black marks are broader, and the row of dots on the hind-wings are wanting: the base of the wings also is often much suffused with black. On the underside, the hind-wings are of a straw colour, with two fulvous bands edged with black, but without any row of black dots. Besides the absence of the distinct black dots so characteristic of the underside of *Cinxia*, the two species may be readily distinguished by the colour of the bands, which is very much paler in *Cinxia* than in *Athalia*. The width across the wings is from an inch and seven lines to two inches and two lines.

This Fitillary varies much both on its upper and under surface. The upper surface varies by being suffused with black scales to a greater or lesser extent than in the normal form. In some specimens the wing is nearly all black; in others there is scarcely any black at all. The underside sometimes has the straw-colour covering the greater part of the wing, while in others there is more black than usual.

Stephens, in his "Illustrations," gives the following varieties, all of which are rare.

Var. *b*. Wings black above, with alternate transverse rows of whitish and pubescent tessellations: the central band on the posterior wings beneath composed of one row of yellowish elongate spots.

Var. *c*. Wings black above, with the two rows of fulvous tessellations towards the hind margin of the anterior wings united.

Var. *d*. Wings black above with very small fulvous spots, those on the outer margin wedge shaped, and the bases of all the wings above nearly immaculate.

Besides these there is the var. *Eos*, of Haworth, now in Mr. Stephen's collection, and is said to be unique, but Mr. Bond has one very like it. The upperside has a darker border on the hind margin, and the inside of the wings suffused with the two colours: within the hind margin of the hind-wings is a series of fulvous lunules, and a single fulvous lunule in the centre of each hind-wing. The underside of the fore-wings has the black concentrated in the middle, and the hind-wings have a broad pale band running across the

underside. It was taken at Peckham, in June, 1803, by Mr. John Howard of Kingsland; and was named by Mr. Haworth in his "Lepidoptera Britannica," after Eos, the Goddess of the morning. Both the upper and the undersides are figured by Stephens in his "Illustrations," under the name of *Pyronia* Hub.

Varieties of *Athalia* occurring on the Continent have been named *Corythalia*, Hub., *Navarina*, De Selys., *Caucasica*, Staud.; all of which appear to be dark forms. *Melanius*, H. S., *Altheria*, Hub., *Tarquinius*, Cort., and *Orientalis*, Men., which has white spots on the underside. *Papilio tessolata*, *serotina*, *Subtus straminea*, as the Straw May Fritillary of Petiver is also a variety of *Athalia*. In Petiver's time, it was pretty common in Caen Wood, where *Athalia* also occurred. It is of a paler shade on the upper surface than the type, and the fore-wings are more fulvous underneath; the hind-wings beneath are entirely straw coloured with black veins; a broad curved fascia of straw yellow runs across the middle of the wings, edged with black, and with an irregular black line running through the middle of it; this is succeeded by a row of black lunules, and the margin is straw yellow with a black vandyked line running along it. Newman, in his "British Butterflies," figures four varieties from the collection of Mr. Bond. The second appears to be a melanic variety with a fulvous band near the hind margins.

The caterpillar, when full grown, is about an inch in length and moderately stout, and is of a black hue with white spots. The spines are of an orange colour, with white tips on the back, and all white at the sides; the spines, bristles, head, and legs being black. Mr. Newman points out the protective resemblance of this caterpillar to the flower of one of the food-plants—the Narrow leaved Plantain, and noticed that his specimens always crawled up the flowering stems in the middle of the day. The food-plants appear to consist of the narrow and broad leaved plantains (*Plantago lanceolata* and *major*), wood sage (*Teucrium scorodonia*), Germander speedwell (*Veronica chamædrys*), and cow wheat (*Melampyrum pratense*), which latter was a discovery of Mr. Harwood, in May, 1871, and was considered by Mr. Buckler to be the principal food-plant in most of the English habitats of the species.

The chrysalis is half-an-inch in length, very plump, with the usual angles much rounded off; the colour is creamy white, variegated with black and orange.

Ichneumon culinator, Schr., is said to have bred from this species, but not so far as we know in this country.

The butterfly may be found in open places in woods, and heathy localities, during June and July. On the Continent, it is said to fly from May to August. The caterpillars hatch in about a fortnight after the eggs are laid, and after

feeding for a short time hybernate at the roots of the food-plants till the following spring, when they feed up quickly. Like the last species they are fond of basking in the full rays of the sun. It does not occur in Scotland or the Isle of Man, but is abundant at Killarney in Ireland. In England, it seems to be most plentiful in the more southerly counties, and is very rare in the midland, not occurring north of Staffordshire. It is rare near London, but abundant in some parts of Devonshire, Cornwall, and Sussex; it also occurs in Kent, Essex, Suffolk, Wiltshire, Buckinghamshire, Gloucestershire, and Staffordshire. It is spread generally over Europe, but only occurs in the northern and western parts of Asia.

It was first figured and recorded as a British species by James Petiver in his "*Papiliorum Britannicæ Icones*," published in 1717, under the name of the Straw May Fritillary, and as being very common in Cain Wood.

Wilkes, in his "*English Moths and Butterflies*," 1773, writes, "The Heath Fritillary Butterfly. I found the caterpillars of this fly feeding on common heath in Tuttonham Wood, about the middle of May, 1745. Six or seven of them were feeding near to each other, I observed their manner of eating, which was extremely quick, and when they moved it was at a great rate. I fed them with common heath for three or four days; at the end of which some of them changed into chrysalis, in which state they remained about fourteen days, and then the flies came forth. This butterfly is very common in most woods, but its caterpillar is very rarely found."

Lewin, in his "*Insects of Great Britain*," 1795, writes, "It may be taken in June, flying in the open parts of woods and dry places, near which heath grows. In some summers it is tolerably plentiful, and in others scarcely to be met with; just as the winter has proved more or less favourable to the caterpillars."

Curtis, in his "*British Entomology*," 1832, writes, "*M. athalia* is found on heaths, marshes, &c., the end of May; in Coombe Wood; Hartley Wood, Essex; Apsley Wood, Bedfordshire; Dartmoor, and near Bideford, and in Bradley Wood, Devon, by Capt. Blomer, as late as the 10th of July. It used to be frequent in Cain Wood, and at Faversham. The *P. tessellata* of Petiver was formerly pretty common in Cain Wood, the beginning of May, where *M. athalia* was common also; I suspect it is only a variety of that species."

The Rev. F. O. Morris, in his "*History of British Butterflies*," 1853, writes, "The late Capt. Blomer used to take this very interesting insect plentifully in Devonshire; Ford Wood is one of the localities there for it, and Dartmoor another; it is taken also in Cain Wood, Middlesex; Bagley Wood, Berkshire, near Oxford; Apsley Wood, and near Bedford; near Deal,

Faversham, Canterbury, and at Coombe Wood, Kent. It occurs near Falmouth, but rarely; W. P. Cocke, Esq., has taken it there; also not very uncommonly near great Bedwyn and Sarum, Wiltshire, as J. W. Lukis, Esq., informs me; and at Langham Lodge Wood, plentifully; as also in Hartley Wood and Malden Wood, near St. Osyth, and in the High Woods, near Colchester, Essex, it has also been taken at Peckham, Surrey, near London."

Stainton, in his "Manual of British Butterflies and Moths," 1857, writes, "Mr. Tress Beale gives the following account of the habits of *Athalia* in the neighbourhood of Tenterden: chief locality, Knock Wood. They are generally congregated in one particular spot—an open heathy place, where the undergrowth is of about one or two years growth. The metropolis is mostly changed each year; for instance, I could point out four different places which have been occupied during the last four years. Stragglers are of course to be met with in other parts of the wood. They are fond of basking in the sun on thistles. When in the net they generally feign death, close the wings and contract the legs."

MELITÆA AURINIA.

Marsh Fritillary.

AURINIA, Rott. Aurin'ia, a Prophetess held in great veneration by the Germans. Tacit, Germ.

The name *Aurinia* was bestowed upon this butterfly by Von Rottenburgh, in 1775; and *Artemis*, the Greek name for *Diana*, by the author of the Vienna Catalogue, in 1776.

The wings on the upperside are of a reddish fulvous, tessellated with pale fulvous and black, the hind-wings having a broad reddish band near the hind-margin. On the underside the fore-wings have an appearance of the markings having been smudged together, and a shining surface, as if it had been greased: whence it is sometimes called the "Greasy Fritillary." The hind-wings are similar to those of the last two species; yellowish, banded with brownish orange, the outer band of which bears a series of black spots, each surrounded by a pale yellowish ring. The front edge of the front-wings is slightly concave in its outline about the middle, whereas it is convex in both *Cinxia* and *Athalia*. The width across the wings varies from an inch and a quarter to three inches.

The Marsh Fritillary varies more generally than any other British butterfly, and though its range of varieties is restricted by the three colours of the type, it is surprising what changes of appearance are produced. The Irish specimens, *Hibernica* of Birchall, are the most beautiful, the colours con-

trasting more, the paler shade being paler than the type, the red bands and spots being brighter red, and the black deeper. I have a small specimen from Carlisle similar to the Irish. The Scotch form, *Scotica*, of Buchanan White, is smaller and scarcely so densely scaled, the red and yellow not so distinctly different, and the black duller in hue. Both this and the Irish form often have the inner half of the red band near the hind-margin of a pale straw colour. In the north of England the insect is like the Scotch form, but as we approach the south the specimens are usually larger, the red and yellow markings still nearer each other in shade, and the black marks and veins are browner. Specimens occur not unfrequently with little or no black on the underside, while Dr. Gill had one with the upperside quite obscured with smoky black.

Two somewhat similar examples are figured in Loudon's "Magazine of Natural History," Vol. VI., p. 378. The first differs from the type by the absence of the red band, which is replaced on the lower wings by a row of black dots in straw coloured rings: there is also a reddish patch running from the middle to the inner-margin of each. This curious specimen was taken by J. C. Dale at Enborne, in Berkshire, on June 16th, 1810. The ocelli on the under-wings give it somewhat the appearance of *Cinxia*. The second was found at Haverfordwest by Capt. Blomer. In this specimen, the upperside is much obscured with smoky black, thus rendering the reddish band very conspicuous. Both of these varieties are females. In another I have, there is a large smoky black patch at the base of the lower-wings.

Stephens, in his "Illustrations," gives the following varieties.

Var. *b*. With the base and posterior margin of all the wings tessellated with fulvous and whitish.

Var. *c*. With the wings similar to the last at the base: the anterior with three oblong fulvous spots near the costa towards the middle; then a fulvous fascia composed of very narrow elongated longitudinal stripes: a waved band composed of quadrate fulvous spots; and a black marginal band bearing lunulated fulvous spots beneath, similar to the first described.

Var. *d*. Posterior wings beneath, with the irregular basal band totally obliterated: the central band not edged with black externally.

Var. *e*. The posterior wings beneath with the basal half fulvous, the exterior half ochraceous, with an obsolete row of black spots.

The variety *Provincialis*, Boisd., occurs in the south of France, &c., and is a large insect with scarcely any perceptible difference between the red and yellow bands, the divisions between them and the wing rays being brownish black. The French type differs considerably from the south of England form,

but these differences, though clear to the eye, are difficult to describe in words.

Merope, Prun. is an Alpine form and approaches the Scotch or North of England specimens, but it is much less densely scaled and has a semi-transparent look, sometimes it is all black and straw colour, except the outer red band on the hind-margins.

The variety *Sibirica*, Staud., occurring in Siberia, differs from most northern specimens, for it is paler than any other, while northern forms are generally dark. *Sibirica* is the same as *Desfontainesii*, Evers. The Spanish and African form is called *Desfontainesii*, Godt., and is the same as *Desfontainesii*, Boisd. and Herrich-Schaffer. It is more uniformly fulvous than any other. The Turkish specimens are paler on the under, and more varied on the upperside, and are called *Orientalis*, H-S.

An allied species *Cynthia*, Hub., bearing a close resemblance to the var. *Hibernica*, Bir., occurs on the higher Alps.

The egg is of an ovate shape, truncated at the top, and slightly flattened at the bottom, and is ribbed from the top for about half the length, the rest of it being smooth: it is of a shining pale brown colour. The eggs are laid in clusters of a hundred or so, on the face of a leaf.

The caterpillar is of a velvety black with black spines, short and blunt tipped, with short, radiating, black, and pointed hairs, and with numerous white dots, in three not very clearly defined rows. The spines are branched, and most numerous from the fifth segment. The head and legs are black, the claspers smoke coloured. It feeds on the Devil's-bit Scabious (*Scabiosa succisa*), and also on plantain.

The chrysalis is short and stumpy, and of a pale stone colour, spotted with black, turning brighter as the time of emergence approaches, when the red and black markings may be seen through the skin.

The butterfly is on the wing from the middle of May till the latter end of June, or sometimes even later in the more northern localities. The caterpillars are gregarious when first hatched, and draw the leaves down together, while they live under shelter of the tent thus formed, and devour the underside of the leaves only. They feed but slowly during summer, and pass the winter low down among the leaves of the food-plant, or other herbage, which are drawn together as described. On the approach of warmer weather they leave their hybernaculum, and feed quite exposed, being apparently as fond of the rays of the sun as the rest of the genus. When full-fed they seek the underside of a leaf, or similar shelter for their final change, which takes place in the latter end of April, or the beginning of May.

Two species of parasitic Hymenoptera have been bred from it, *Apanteles Bignellii*, Marsh., and *spurius*, Wesmael.

Newman, in his "British Butterflies," states, that nine out of ten of his caterpillars were infested with a species of *Microgaster*, varying from ten to twenty-six in each caterpillar. They emerged in similar manner to the well-known parasite of *Pieris brassicae*, spinning small silken cocoons outside. Probably they belonged to one or the other of the above mentioned species.

The Marsh Fritillary frequents damp meadows, or similar places. Where it occurs it is often exceedingly local, frequenting perhaps one corner only of a field, and after changing its head-quarters, quite disappearing from the place where it abounded one year, and being as abundant the next year in another spot not far away. It occurs in every English country and in several parts of Ireland and Scotland below the Caledonian Canal. It is generally distributed over Northern Europe and Siberia, but does not occur in the polar regions. It scarcely reaches the countries bordering on the Mediterranean, though one variety occurs in Turkey, and another in Spain (Andalusia) and in Barbary in Africa. It is first described as a British species in Ray's "Historia Insectorum," published in 1710.

Petiver, in his "Papilionum Britannicæ Icones," 1717, calls it "Dandridge's midling Black Fritillary," and that Mr. Dandridge observed it in Cain Wood and the Oak of Honour Woods near Dullidge, about the end of May and beginning of June.

Wilkes, in his "English Moths and Butterflies," 1773, writes, "About the 10th of April, 1741, I took upon the ground upwards of one hundred of these caterpillars, in Cain Wood. I gave them to eat a variety of growths which I gathered on the spot where I found the caterpillars, but they were so restless and uneasy under confinement, that they seemed in continual motion, neither would they eat any of the food I give them. On the 18th of April, ten of the caterpillars fastened themselves up by the tail, in order to change into chrysalides (the rest being gone away or dead), and on the 3rd of May following the flies were bred. This butterfly is to be taken in woods and grass fields adjacent to woods, in the month of May."

Moses Harris, in his "Aurelian," 1766, writes, "They are generally found on the side of a hill that rises with an easy ascent, and fronts the east, by which they have the sun most powerful in the morning, and avoid the too scorching heat in the afternoon. It was said that they fed on plantain and grass, but I found that to be a mistake, having often endeavoured to feed them with both, but my endeavours were always fruitless, and accordingly on the 18th of April, 1760, I went to Neesdon, Wildsden, about seven miles from London, where I was informed they were in great plenty, as indeed I found them to be. Here I took great pains to watch their actions for full two hours. I paid them several visits a few days afterwards, that I might be

able to give a satisfactory account of them. Their food is the Devil's-Bit Scabious, which, at that time of the year, hardly appears above ground. They feed on the opening leaves as fast as they come up, which is the reason why those who found the caterpillars could never see the food. When the sun happens to be shut in by clouds they stand still, and though eating very greedily, they will suddenly cease: but on the return of the sunbeams, they run nimbly over the tops of the grass, and descend into every vacancy in the grass they can find in search of this food. Nor did I ever find above two at one root, although the field appeared to be covered with the caterpillars. When in their last skin they appear to be very black, and thickly set with sharp spikes; and their back and sides are powdered with white specks. The preparation they make for the preservation of their chryslides is much to be admired. When one is ready for his transformation, his first business is to draw several pieces of blades of grass across each other toward the top. These he fastens together with his web, and then beneath the centre, where the blades of grass intersect each other, he hangs himself pendulous by the tail, and changes to the chrysalis. This method they have of providing for their safety while in the chrysalis state, is a strong proof of the amazing instinct of these little creatures. They are not only securely hid from the sight of birds, but defended from the damage they might otherwise sustain in boisterous and windy weather; for, as the grass is drawn from every side, let the wind blow which way it will, one or more of the pieces of the grass immediately acts in the manner of a stay. It is remarkable in this insect that neither fly nor caterpillar will stray from the field in which they were bred, and though I have seen some thousands in the field, yet I could never find one in the meadows adjoining. In September the caterpillars may be seen in great abundance. They keep together under the cover of a fine web, which they spin to defend themselves from the inclemency of the weather, and under the protection of this they pass the winter months."

Stephen's, in his "Illustrations of British Entomology," 1828, writes "A local species, rare near London, but particularly abundant near Brighton, and at Enborne, in Berkshire; it also occurs near Norwich; in Clapham Park, Bedfordshire; in Dorsetshire; in Glamorganshire; at Eriswell and Mildenhall, in Suffolk; Dartmoor, in Devonshire; and at Beachamwell, in Norfolk; usually towards the end of May."

Newman, in his "British Butterflies," 1871, writes, "In Ireland it is common, occurring in the county Wicklow, also in Galway and at Killarney; and is abundant at Glen Lough and Cromlyn Bog, in Westmeath, where it is very highly coloured and very various in size. In Scotland it seems rare and local, but increases as far north as Forres. Scottish specimens are

slightly smaller and darker than English ones. In Cumberland it is abundant at the Brick House, Saburgham. The caterpillars from this bleak place produce very small dark specimens, and also some beautiful varieties with large canary-coloured spots on the fore-wings."

This brings to a close the second division of the Butterflies, viz. "Pendulæ," so called because the chrysalides are attached by the tail only, and swing in the air, with the head pointed towards the ground.

The third and last division is called "Involutæ," from the circumstance of the caterpillars concealing themselves in a silken follicle or cocoon before changing into chrysalides. These cocoons are generally hidden in rolled-up leaves, or at the roots of grass; some of them are even attached to grass stems. The simple structure of the chrysalis, and the habit of the caterpillar of rolling up leaves are peculiarities at variance with the general characters of the Diurni, and agreeing with the Heterocera.

Family HESPERIDÆ.

This is a family of butterflies generally of small size and obscure colours, and very numerous in species, probably more than fifteen hundred are known, and of this number at least half are natives of tropical America. Many fine species occur in India, and but few in Australia, Africa, and Europe. In the last named quarter of the globe there are scarcely more than thirty species. Their flight is extremely rapid, the eye being hardly able to follow their movements. They delight in the hottest sunshine; and their small powerful wings, enable them together with their robust bodies to rival the hawk moths in swiftness. Their peculiar flitting movements have caused them to be named "Skippers" by our English collectors. Many of the species possess a pair of spines in the middle of the hind tibiæ, which are not found in any other butterflies. In some species, *Nisioinades tages*, *Tamycus zelevucus*, &c., all the wings lie in a deflexed position when the insect is at rest; but in most of the species the hind-wings are deflexed, whilst the fore-ones are more or less perpendicular. It is on this account that Dr. Agassiz regarded the Hesperidæ as a lower type than the majority of butterflies (which on account of their resting with their wings in a position opposed to that which they occupied in the chrysalis state, are considered not only as higher than the rest of the Lepidoptera, but also than all other insects.) The veins of the wings offer several remarkable particulars: thus, the four branches of the postcostal vein of the fore-wings arise at nearly equal distances apart, before the anterior extremity of the discoidal cell, closely followed by the two dis-

coidal veins and the branches of the median vein; the whole forming a series radiating from the discoidal cell in so regular a manner, that Dr. Herrich-Schäffer regards this group as the type of the Diurnal Lepidoptera on this account. The more or less obsolete character of the discoidal vein of the hind-wings, and the arrangement of the basal portion of the veins are further peculiarities of the family. The peculiar distinction indicative of the sexes, afforded by the structure of the fore-legs in many of the preceding genera, is here wanting; and it is consequently difficult, except in those species where the wings afford sexual distinctions, to determine the sexes of different individuals. In some, *Tages*, &c., the fore-margin of the fore-wings is recurved in the males, the enclosed space being thickly clothed with pale coloured down. In others, *Linea*, *Comma*, *Sylvanus*, &c., there is a thickened and oblique ridge on the middle of the fore-wings. Hubner divided the family into forty-two genera or sub-genera. In Britain we have four, viz.: *Cyclopides*, *Hesperia*, *Syrichthus*, and *Nisoniades*.

GENUS XXI.—CYCLOPIDES.

Hubner.

CYCLOPIDES, the sons of Neptune who assisted Vulcan in forging Jupiter's thunderbolts. The genus was also named *Carterocephalis* by Lederer, and *Steropes* by Boisduval. The species of this genus or sub-genus differ from those of the next in the differently formed club of the antennæ, by having a more slender body, and especially by the want of an oblique black patch across the middle of the wings of the male, and the identity of colouring in the sexes. A more important character, however, consists in the posterior tibiæ possessing only a pair of spurs at the tip. There are only a small number of species known, four of them occurring in Europe.

PANISCUS.

Chequered Skipper.

PANISCUS, Fab. Panis'cus, diminutive of Pan, the God of Shepherds; also named *Palæmon* by Pallas, which latter name is sometimes adopted.

This pretty species is generally about an inch and a quarter in the expansion of its wings, which on the upperside are of a rich dark brown colour, chequered with orange tawny spots. The underside is similar but paler. The spots differ in size in different specimens, but otherwise it does not appear to vary, nor is there any material difference between the sexes. The antennæ are of a bright fulvous yellow beneath, and annulated with black and

yellow above. The width across the wings is from an inch and one line to an inch and two lines.

The egg is of a hemispherical shape, with flat base, and is of a white and shining colour, resembling porcelain.

The caterpillar when newly hatched has a largish and uniformly cylindrical body, which is velvety white; the head is black and shining, and there is a shining black linear plate on the second segment. After feeding a couple of days, the colour of the body changes from white to a very faint tint of bluish green. When full-fed, the ground colour is a pale orange white, with a pale reddish brown dorsal line, and a yellowish sub-dorsal line.

The chrysalis is long, slender, and nearly cylindrical, with the head blunt and the eyes rather prominent and a sharp spike between them. The anal end is rounded, with a flat spike set at the tip, with a dozen or more curled spines of different lengths. The colour on the back is a creamy white, with a very dark brown central line, a sub-dorsal of pale buff bordered with reddish brown; the wing-cases are of a pale flesh colour faintly tinged with dark brown. (Rev. J. Hellins, in "Buckler's Larvæ.")

The butterfly is on the wing in May and June. The caterpillars are hatched in June, and feed on the wood brome grass (*Brachypodium sylvaticum*.) They draw the tips of the leaves together, so as to form little cylindrical retreats, which they make secure by spinings of silk. When they out-grow the tubes they make fresh ones. Mr. Buckler writes, "On the 10th of October, one had spun itself up by drawing a leaf round itself as it lay on the underside. The leaf not being broad enough, the two edges did not quite meet, and the interstice had been well covered with whitish silk, forming a complete cylindrical silk-lined hybernaculum; other caterpillars seemed ready to follow this example. They leave their hybernaculum in March, feed up quickly and then turn into chrysalides."

Cyclopides paniscus is common over a good part of Central Europe, and in Russia extending to Finland and Siberia. In the North-west of Europe, it is a very local species, and is met with in open places in woods. It does not occur at all in either Scotland or Ireland, and only in a few midland and southern counties of England. It appears to occur most plentifully in the counties of Huntingdonshire, Northamptonshire, and Nottinghamshire, and more rarely in Suffolk, Oxfordshire, Lincolnshire, Hampshire, and Dorsetshire (one specimen.)

The first account we have of it as being a British species is in the "Transactions of the Linnean Society," Vol. V., Nov. 6th, 1798, "The Rev. Mr. Abbot, F.L.S., informed the Society of his having taken the *Papilio paniscus* in Clapham Park Wood, Bedfordshire." He observes "that this

Papilio is most easily taken in May and June, when the *P. lucina*, or Duke of Burgundy Fritillary, is out; but the term of its existance seems to be longer, as some specimens have been caught, in good condition, a full fortnight after the *Lucina* has disappeared. It is to be found from 7 to 9 o'clock in the morning; very often playing in pairs just after sunrise, or at least as soon as the morning fog has evaporated. Its flight is extremely short, very near the ground. It delights to settle on the blades of very long grasses or Carices, and is far from being a timid insect. "Mr. Abbott wishes to name it the Duke of York Fritillary. With its caterpillar and chrysalis he is unacquainted."

The first specimens were taken by Dr. Abbott on May 8th, 1798.

Haworth, in his "*Lepidoptera Britannica*," 1803, writes, "Habitat imago sylvaticis May: rarissima, sed prope Bedfordium frequentius capta et ad me missa amico meo C. Abbott, D.D."

In the end of June, 1802, Dr. Abbott took faded specimens in White Wood, Gamlingay, Cambridgeshire. It was next taken in great plenty in the Hanglands, Milton, near Peterboro, on May 1st, 1823, by Mr. Henderson, Lord Milton's gardener; and in the same place on June 6th, 1826, by J. C. Dale.

Stephens, in his "*Illustrations of British Entomology*," 1828, writes, "Generally reputed a scarce, but merely a very local species; it occurs in great plenty in several parts of Northamptonshire and Bedfordshire at the end of May. Between Woodstock and Enstone, Oxon—Rev. W. T. Bree. Near Dartmoor, Devon—Miss Jermyn."

In the "*Entomologist*" for 1841, Mr. Doubleday records it as being in profusion in Monk's Wood and in a wood near Oundle, Northamptonshire.

In the "*Entomologist's Weekly Intelligencer*," for 1857, Mr. Harvey writes, "I have great pleasure in announcing that this year I have taken this rare insect at Netley Abbey, near Southampton: and Mr. Sturgess writes, "I have much pleasure in stating that this very local insect has been taken very freely in the neighbourhood of Kettering during the past month."

In the "*Entomologist*," Vol. XV., for 1882, the Rev. W. Fowler writes, "In a wood about seven or eight miles from Lincoln, while hunting for Coleoptera on June 2nd, I saw *Hesperia Paniscus*, evidently not uncommon in one locality. On two subsequent occasions I visited the wood, but each time a thunder storm, followed by heavy rain, came on just as we reached it, and stopped our operations; we, however, took one specimen each time, showing that it was still out, and I have no doubt that the insect was fairly plentiful."

GENUS XXII.—HESPERIA.

Latreille.

Hes'peria, an ancient name for Italy.

The short thick club of the antennæ, terminated by a short slender recurved hook, and the minute size of the last joint of the labial palpi, are the chief characteristics of this genus, in addition to the velvety oblique streak in the wings of the males of many of the species. The general colour of the wings is either tawny orange marked with brown, or brown strongly marked with orange; the colour being generally so disposed as to leave a row of spots near the apical margin of the fore-wings; the colours of the female, moreover, are brighter than those of the males.

Over three hundred species have been described; of which four only are found in the British Isles.

HESPERIA COMMA:

The Silver-spotted Skipper.

COMMA, Linn. Com'ma, thus named on account of the mark of the fore-wings.

The wings on the upperside are of a rich brown, blotched and spotted with fulvous; the spots towards the tips of the fore-wings being of a whitish fulvous: on the underside greenish, with square white spots.

The width across the wings varies from an inch and two lines to an inch and four lines. There is a black streak on the fore-wings of the male.

Like all the Skippers it is remarkably constant to the type. One form is named *Catena*, Stgr., having the hind-wings greenish. It occurs in Lapland. Two fine varieties are figured in Mosley's "Illustrations." One from the collection of the late Mr. Alfred Owen, has the usual pale spots nearly white. The other which was taken at Newmarket, and is in the rich collection of Mr. Bond, has the spots and markings of the usual hue, but the other portions of the wing, which are generally darker, are all of a pale greenish drab.

The egg is dome shaped, with a small circular depression on the summit, the surface being apparently smooth. When freshly laid it is of a creamy white colour, but afterwards becomes darker with the faintest possible tinge of bluish green. In size it is about $\frac{1}{16}$ of an inch wide, with rather a flattened top, about $\frac{1}{8}$ of an inch across, and is $\frac{1}{3}$ of an inch in height. (Rev. J. Hellins.)

The caterpillar is of a dull green mixed with red ; second segment white ; head black ; there are also two white spots near the bottom of the tenth and eleventh segments. It feeds on the bird's foot trefoil (*Lotus corniculatus*) and other papilionaceous plants.

The chrysalis appears never to have been described.

The butterfly emerges in July and continues on the wing for more than a month. The caterpillars are hatched in April and turn into chrysalids in June.

Hesperia comma occurs throughout Europe and Northern and Western Asia, on heaths, downs, &c. It is unknown in Scotland, Ireland, or the Isle of Man, and is a very local species in England, occurring on chalk downs. It is common in the counties of Kent, Sussex, Surrey, and Cambridgeshire, and rare in those of Devonshire, Dorsetshire, Wiltshire, Gloucestershire, Buckinghamshire, Berkshire, Hertfordshire, Northamptonshire, and Yorkshire.

It appears to have been known in Britain as long ago as 1667, for Dr. Christopher Merrett, in his "Pinax rerum Naturalium Britannicæum," gives the following description of a butterfly : "Alis conchatis, et clavatis : ex albo et obscure rubente varias."

Moses Harris, in his "Aurelian's Pocket Companion," 1775, records the Pearl Skipper as being found in swampy ground on briars, Hanwell Heath, near Ealing, on August 25th.

Lewin, in his "Insects of Great Britain," 1795, writes, "This butterfly is said to be out on the wing in August, and to have been taken on the swampy ground on Hanwell Heath, near Ealing, in Middlesex. The specimens of this fly that I have seen lead me to think, that it is not a distinct species, but merely a variety of the Large Skipper."

Donovan, in his "Natural History of British Insects," Vol. IX., published in 1800, writes, "In the beginning of August, 1772, a brood of these insects were taken near Lewes, in Sussex, by the late Mr. Green ; and we believe no other specimens have been taken since that period. It is not very unlike the *Papilio sylvanus* of Fabricius, but may be readily distinguished from it by the square spots on the underside being perfectly white."

Stephens, in his "Illustrations of British Entomology," 1828, writes, "A local species occurring in plenty on Riddlesdown, near Croydon, and on the chalky downs of Sussex, especially near Lewes. It used formerly to be taken on Hanwell Common, Middlesex, but I have not heard of recent captures near that place : it appears towards the end of August. Discovered in considerable abundance towards the middle of August, 1825, on the Devil's Ditch, between the running gap and the turnpike ; the specimens remarkably

large and fine.—Rev. L. Jenyus, Old Sarum, Wilts., 1826.—J. C. Dale.”

The Rev. F. G. Morris, in his “History of British Butterflies,” 1853, writes, “This species is plentiful near Newmarket, and at Gogmagog Park, near Cambridge; Mr. Dale records the neighbourhood of Hull as another locality for it; Barnwell and Ashton Wild, and the neighbourhood of Polebrook, Northamptonshire; near Dover, Kent; Old Sarum, Wiltshire; Croydon, Surrey; Lewes and Brighton, Sussex, are also its habitats, and Blandford also.

HESPERIA SYLVANUS.

Large Skipper.

SYLVANUS, Fab. Sylva'nus, God of the winds, Virg. Georg.

The wings on the upperside are of a rich brown, blotched and spotted with fulvous: on the underside of a greenish brown, indistinctly spotted. The male has a black streak on the fore-wings. The width across the wings varies from an inch and two lines to an inch and four lines.

This butterfly varies a little in hue, and in the extent or clearness of the paler markings, but is still very constant to the type. A fine variety is figured in Mosley's “Illustrations.” It has the wings of an orange yellow, paler towards the hind-margin, which is dark brown; there is also a dark brown spot on the costa, near the tip.

The egg at first is of a dull white, being afterwards tinged with yellow, and is of a globular shape, with the base flattened: the shell is dull and finely granulated, and covered all over with extremely faint blunt hexagonal reticulation, with fine reticulation just on the top.

The caterpillar, when young, is of a pale yellowish colour, with black dots set with exceedingly short bristles, and a large smooth brilliant jet black head. At the end of three weeks or so, the colour changes to a dull green, and it spins together the edges of the grass blades, and makes an opaque web, not much bigger than itself for a hiding place. After hybernation in May, the colour is a pale green, the skin being thickly covered with very fine short dark brown bristles, the head of a dirty white, with dark brown stripe. It is of a cylindrical shape, and feeds on various grasses (*Holcus lanatus*, *Luzula pilosa*, &c.)

The chrysalis is of a chocolate brown colour, slender in shape, and is enclosed in a folded blade of grass. The butterfly appears on the wing in the end of May and June, and also in July and the beginning of August.

Hesperia sylvanus is found all over Europe, except the extreme north, and in Northern and Western Asia. It is widely distributed and common in

England, but scarcer in the north, and apparently unknown in Northumberland. In Scotland, it occurs only in the south, and is not common. It is also a scarce and local species in Ireland, but more common in the Isle of Man. It was first described and figured as British by James Petiver, in 1717, in his "*Papilionum Brittanniæ Icones, Nomina, etc.*," and recorded as occurring at Hampstead, under the name of the "Cloudy Hag."

Moses Harris, in his "*Aurelian*," 1778, writes, "The caterpillar of this fly has never yet been discovered in this country. The moths delight to fly in woods, and lanes near woods: their actions are somewhat remarkable, and not unworthy of notice, for whenever they settle, which is very frequent, as they are never long on the wing, they are sure to turn half-way round, so that if they settle with their heads from us, they turn till their heads are toward us, and sometimes till they have turned quite round. When on the wing, they have a kind of skipping motion, which is effected by reason of their closing their wings so often in their passage, and whenever they settle they also close their wings. They are found in the months of May and August, as there are two broods a year. The male is much the less."

Lewin, in his "*Insects of Great Britain*," 1795, writes, "This is a very common butterfly. There are two broods of them in the summer: the first makes its appearance the middle of May, and the second is on the wing in August. It frequents, woods, heaths, and lanes. Its flight is very short; but when on a bush or shrub, it is almost constantly in motion, skipping or leaping from leaf to leaf. From this habit, common to all the flies of this section, it derives the appellation of Skippers."

Donovan, in his "*Natural History of British Insects*," Vol. VIII., published in 1799, writes, "Fabricius has no reference to any author for a figure of this species, nor is it described by Linnæus; this is the more remarkable, as the species is found in great abundance in the months of May and June in this country, and is not uncommon by any means in Sweden and Germany."

An allied species *Vitellius*, Abbott and Smith, Lep., Georgia, 3 f. 17, is stated by Mr. Haworth, in the "*Entomological Transactions*," 1812, to have been caught in Bedfordshire by the Rev. Dr. Abbott, although he added that he possessed specimens of the same from Georgia, in America. Of the female two specimens were taken at Barnstaple, in Devonshire, by Mr. W. Raddon (or supposed to be), and communicated to Mr. Stephens, who published a figure of this presumed species in his "*Illustrations*," in 1828, and gave it the name of *Bucephalus*, or the Large-headed Skipper.

Mr. Stephens, after describing it goes on to say, "Taken in the neighbourhood of Barnstaple, in Devonshire, by W. Raddon, who possessed two specimens of the insect, which he assures me were captured by himself in the

above locality several years since. I have therefore on his testimony admitted the species; but I cannot help surmising that its origin is questionable, and that the specimens were probably imported in one of their earlier states, among the timber or other stores which Mr. Raddon acquaints me came direct from the North American continent to Barnstable. I am induced to say this much from the circumstance of the section of the genus to which this insect belongs, being without any other exception exclusively found in America." A specimen was also stated to have been taken by Mr. Newman near Godalming, in Surrey. J. C. Dale had one of the above *Bucephalus* from Mr. Raddon, who had placed them as the females of *Sylvanus*, not having the true female, evidently a mistake. J. C. Dale had also Dr. Abbott's specimen of *H. vitellius*. It is possible that Dr. Abbott received it from the American Mr. Abbott, to whom he was supposed to have been related.

HESPERIA LINEA.

Small Skipper.

LINEA, W.V. Li'nea, named such on account of the line on the fore-wings. It has also been described by Hufnagel under the name of *Thaumus*, but that name was applied by Fabricius to an American species from Philadelphia.

The wings on the upperside are of a rich fulvous shaded into brown at the borders. The male has an oblique blackish line near the centre of the fore-wings but they are not clouded with brown, as are those of *Acteon*. On the underside the wings are unspotted, the hind-wings being of a greenish tawny, the fore-wings of a dull tawny. The width across the wings is from one inch and a line to an inch and three lines. It is but rarely known to vary. A male of the pale or bone coloured form is figured in Mosley's "Illustrations," and Mr. Bond has the same form in both sexes, as have a few other collectors. In those specimens there is no change in the markings.

The egg is not at all like that of *H. Sylvanus*, but is considerably smaller, of a long oval figure, half as long again as wide, the shell glistening, devoid of ribs or reticulation; at first white, then turning dull yellowish, and at last paler again, with the dark head of the caterpillar showing through.—(Rev. J. Hellins.)

The caterpillar when young is of a pale dull yellow, and is slender, cylindrical, with a very smooth skin, and no bristles except on the second and thirteenth segments, and some very short ones on the head. When full-grown it is ten lines in length, and is of a tender and delicate grass green colour,

without any gloss, with a dorsal stripe of a darker and bluish green, having a stoutish line of paler green running through the middle, and bordered outside in stronger contrast by a stout line of green still paler than the ground: the head is of rather a deeper green than the body, and rough with minute points: there is also a transverse path of white on the front of the ventral surface of the eleventh and twelfth segments. It is cylindrical in shape, but tapers towards both extremities. It feeds on soft-haired grasses, *Holcus lanatus*, *Brachypodium sylvaticum*, &c., and spins little ropes of silk across the blades of grass, making little web coverings. When ready to turn into chrysalis it encloses itself within two or three leaves of the grass, joined together longitudinally by lacing or spinning with white silk.

The chrysalis is of the same light green as that of the caterpillar, of which the paler lines can still be faintly traced. It has a pointed head-case, and is very sharply tapered towards the tail, much resembling in form that of *H. actæon*.

The butterfly appears on the wing in July and the beginning of August; the egg is laid on the food-plant, and the caterpillar hibernates quite small, feeding up in the spring, and assuming the chrysalis state in June.

Hesperia linea is found all over Europe except the extreme north, and occurs also in Asia Minor, Persia, and North Africa. It is generally distributed in England, but most abundant in the south. It does not appear to frequent either Durham or Northumberland, nor has it been taken in Scotland or the Isle of Man, but Mr. Birchall has taken it in Ireland at Powers-court, and near Cork, and it probably frequents many other places in the Emerald Isle.

It was first described as a British species in Ray's "Historia Insectorum," 1710, and recorded as appearing in pastures in the beginning of July.

Petiver, in his "Papilionum Britannicæ Icones," 1717, calls the male the "Spotless Hag," and the female the "Streakt Golden Hag." In his "Gaz. Nat." he records it as being taken by Mr. Dandridge.

Moses Harris, in his "Aurelian," 1778, writes, "Small Skipper. The caterpillar of this fly is also undiscovered. The moth flies in woods, and its actions are also similar to the above; but there is only one brood a year and they appear about the middle of July."

Lewin, in his "Insects of Great Britain," 1795, writes, "This minute fly is met with on heath, common, and lanes, in most parts of England. It is first out on the wing the beginning of July, and may be readily taken; as it flies but little, and frequently settles, and skips from leaf to leaf on low bushes, rather than take wing when disturbed. The caterpillar of this species is likewise unknown."

Donovan, in his "Natural History of British Insects," 1798, writes, "A very generally diffused species, but not common; it is similar to the *Papilio sylvanus* of Linnæus, or *Hesperia sylvanus* of Fabricius, which is in the greatest abundance in the skirts of woods in summer."

Stephens, in his "Illustrations," 1828, writes, "Less common than the *P. sylvanus*, but nevertheless pretty abundant; it frequents the borders of woods and shrubby places, towards the end of July."

Newman, in his "British Butterflies," 1871, writes, "In England it is generally abundant, more particularly in the southern and midland counties, but has mysteriously disappeared from many places where it was formerly common; in Essex, it occurs in open swampy places that are covered with rushes."

It is a very abundant species in Dorsetshire, both on the coast and inland.

HESPERIA ACTÆON

Lulworth Skipper.

ACTÆON, Esp. Actæ'on, a hunter, who seeing the goddess Diana bathing in a fountain, was changed by her into a stag, and then was pursued and devoured by his own hounds, who took him for a real stag.—Ovid. Met.

The wings on the upperside are of a dull rich brown, shot with fulvous, and with a narrow dark hind-margin. The male has a black line from the centre of the wing nearly to the base of the inner margin. The female has a curved row of rather pale fulvous spots. On the underside, a greenish tawny is the prevailing colour. The width across the wings is from an inch to an inch and two lines.

The only varieties, I have seen or heard of, are a couple of females without the spots, in my own collection.

The egg does not appear to have ever been described.

The caterpillar is of a cylindrical shape, but tapers somewhat towards both the head and tail. It is of a pale greyish green, with two yellowish longitudinal lines down the back, the space between them being rather darker than the ground colour, and a yellowish line at the sides. The ventral area is marked on the tenth and eleventh segments with a snow white patch, which appears to be a peculiarity of the whole genus. The colour of the head is brown in the young caterpillar, pinkish green in the old ones, with two lines down the face. The spiracles are of a pale flesh colour, and the legs are very short and of a green colour. It feeds on grasses, *Brachypodium sylvaticum*, *Triticum repens*, *Calamagrostis epigejos*, &c. The habit of feeding is as follows: ascending high up the blades of the grass, it eats out a

wedge-shape portion from the side, which cuts off the pointed top, leaving an oblique edge above, and proceeds to eat away large wedge-shaped pieces from the side of the blade; when tired of feeding it moves lower down the blade, and spins a coating of white silk from one side to the other, causing the two edges of the blade to draw together a little, and then in a silk lined hollow rests awhile, and then comes out again to feed. When full-grown it seeks for a retired shelter, which it finds between some leaves, of which it forms a spacious habitation by spinning, in the open parts, a thin wall of whitish silk web, with large and very irregular meshes; the resting place being thickly covered with whitish silk, but most thickly where the tail of the caterpillar is to rest. In four or five days it changes into a chrysalis.

The chrysalis is very slender, and is three-quarters of an inch in length, with two lines across the arched thorax, and has large prominent eyes; the top of the head is a trifle flattened, and has a beak-like process projecting forwards, of a flattened triangular shape; the tail ends in a prolonged and blunt flattened tip, furnished with a circle of exceedingly minute recurved hooks. The wings, antennæ, and legs are plainly developed, and the proboscis is extended at full length down the body, from which it lies wholly free towards its extremity. It is of a very pale and delicate yellowish green colour, on which all the stripes of the caterpillar, though faint, are to be seen. Just before the emergence of the butterfly, the colour changes to a purplish black.

There are apparently two broods of the butterfly, the first appearing in June, the second in August, but specimens may be met with all through the summer. In 1833, the butterflies appeared as early as the 31st of May, and in 1888, worn examples were still on the wing as late as the 13th of September. The eggs are laid in June, July, and August. The caterpillars hatched from the earlier laid eggs feed up before winter comes on, and hibernate probably in the chrysalis state. Those from the later eggs hibernate small, and feed up in the spring. Being full-fed in the middle or end of June, they remain about a fortnight in the chrysalis state.

Hesperia actæon is a very local species, though abundant where it occurs; and is found in central and Southern Europe, Asia Minor and North Africa, also in the Mauritius and the Canary Islands. At Meseritz, in Austria, the caterpillars were found by Professor Zeller feeding in June, on the wood small reed grass (*Calamagrostis epigejos*), chiefly under the shade of fir trees. In Britain, it is exclusively confined to a very few restricted localities on the south-west coast, chiefly in Dorsetshire, where it frequents places along the coast, from Swanage to Preston, near Weymouth, and also the line of chalk hills from Swanage to Upaney. It has also been taken on the cliffs east of Sidmouth, and at Torquay, in Devonshire; and near Falmouth, in Cornwall.

The principal localities, though, are Lulworth Cove and the Burning Cliff, on the Dorset coast, where they may sometimes be found in plenty, settling on the wood brome grass (*Brachypodium sylvaticum*), on which the caterpillars feed.

This interesting addition to our meagre list of British butterflies, was made by my father, on August 15th, 1832. On that day he captured no less than three species new to Britain, viz.: *Hesperia Actæon*, *Habitophagus Curtisii*, and *Eucyrtus Mirabilis*. The middle one belongs to the interesting and curious order of bee parasites, to which the Rev. W. Kirby gave the name of Strepsiptera. It is one of the rarest of our British species, there being only two specimens in existence, and both captured by my father. The last is one of the parasitical Hymenoptera.

Hesperia actæon was first figured and described as a British species on the 2nd of March, 1833, by John Curtis, in his "British Entomology," and the name of the "Lulworth Skipper" bestowed upon it, accompanied by the following letterpress: "The insect at the top of the plate is the male, the other flying the female; the male at rest is represented of the natural size. We cannot often hope to record the addition of a butterfly to our British Fauna, but this species was discovered at Lulworth Cove, in Dorsetshire, last August, by J. C. Dale, Esq., through whose liberality it now ornaments most of our cabinets: it was found upon thistles, and was very local."

The exact place where the first specimen was captured is called Durdle Dove, and is situated to the west of Lulworth Cove.

Stephens, in his "Illustrations"—Appendix—published in 1834, writes, "I am indebted to the Rev. J. Lockey for this species; it was found by him in plenty near the Burning Cliff, in Dorsetshire: it has also been previously taken at Lulworth Cove, in the same county, in August."

Messrs. Humphreys and Westwood, in their "British Butterflies," 1841, writes, "This extremely local species was discovered in August, 1832, by J. C. Dale, Esq., near Lulworth Cove, in Dorsetshire, in considerable numbers, frequenting thistles. It has since been found by the Rev. J. Lockey, near the Burning Cliff, in Dorsetshire, in plenty."

Mr. S. Stephens, in a communication to the "Zoologist," Vol. V., 1847, writes, "This Skipper, which has been so scarce for the last eight or ten years, I had the pleasure of taking on the 2nd of August last in plenty under the Burning Cliff, on the coast of Dorsetshire, between five and six miles from Weymouth; I found a few on the flowers of the thistle and ragwort, but most on the flowers of a carex, which grew in clusters close to the beach. The insect was extremely local, being confined to a space of about one hundred yards. Mr. Dale, who kindly told me the locality whilst on a visit to his place, has

been to Lulworth (the original locality for the insect) for the last five years, and twice to this, without success, and it is now twelve years since he found it in plenty. I was a fortnight or three weeks too late, I regret to say, for I met with very few fine out of one hundred and thirty that I captured in five hours."

The Rev. F. O. Morris, in his "History of British Butterflies," 1853, writes: "In company, some years ago, with my friend J. C. Dale, Esq., late High Sheriff of Dorset, I formerly captured this, then newly by him discovered, insect, I mean as a British one, in plenty at Lulworth Cove, Dorsetshire—a charming place, where you will be fain to wish that you could for ever watch the glorious ocean, dashing up from its dark depths against the steep cliffs, which there presents an aspect of the utmost seclusion and the most lovely retirement. Wild must all around be in winter, but this small butterfly rejoices in the settled summer, more fortunate than some of its class, who are tempted out to woo the 'beautiful spring': often their reception is cold and chilling, and their day-dream of happiness is blighted, like the contemporary delicate flower that has peered out too soon from its sheltered nook, and must again hide its head for a season, till the skies are more propitious, and the sun shall shine undisturbed upon it. Now it is not to be seen there, though it is still to be found at the Burning Cliff, nearer Weymouth, where my friend, the Rev. Francis Lockey, of Swanswick Cottage, near Bath, has taken it in plenty."

Stainton, in his "Manual of British Butterflies and Moths," writes, "A very local species: Lulworth, Dorsetshire, and Sidmouth, Devonshire."

Mr. Douglas has given me the following note of his experiences of this insect in Dorsetshire: "In July, 1849, my late friend, H. H. Farr was staying at Weymouth for the benefit of his health. I stayed a few days in his company, and made some entomological excursions with him to Portland and other places adjacent. One bright sunny morning we hired a boat, owned by one of the amphibious long-shore dwellers, whom we took with us, and found he was a character, and could turn his hand and tongue to anything. An hour's sail across Weymouth Bay, during which we amused ourselves by catching mackerel, brought us to the desired spot, the Burning Cliff, where we had been told we should find *Pamphila actæon*, and there, sure enough, we found it in profusion. The spot, close to the sea, is a kind of undercliff, not very level, of no great extent, and covered with thistles and large tufts of a long coarse grass or carex, about which our prey were skipping briskly. So abundant were they that I often had five or six in my net at one stroke, and in about two hours I caught a hundred, filling my box and my hat; and Mr. Farr had nearly as many. They were accompanied by

a few of the common *P. linea*, which, in their flight they greatly resembled."

In the "Entomologists' Monthly Magazine," Vol. I., Mr. Trovey Blackmore writes, "This species seems to be very irregular in the time of its appearance. I took it in abundance, in very fine condition, in 1858, at the end of July, both at Lulworth Cove and at the Burning Cliff; whereas, the few specimens that I met with in the corresponding week this year, 1864, at the latter locality, were in a very wasted state, and had, apparently, been on the wing for some time. I met a member of the Entomological Society on the cliff, who had walked over there from Lulworth, where he had taken a few specimens in no better plight than mine."

My first capture of *Actæon* was made on the 27th of July, 1869, when I drove over to Lulworth and captured fourteen; also one of *Linea*, four of *Sylvanus*, two of *Corydon*, and several of *Galathea* and *Semele*.

Newman, in his "British Butterflies," 1871, writes, "We are indebted to the indefatigable Mr. Dale for the discovery of this insect at Lulworth Cove, in August, 1832, as announced by Mr. Curtis in his "British Entomology." I believe it to be extremely local—that is, frequenting particular spots, scattered at intervals all along the sea coasts of Dorset and Devon. The Warwickshire localities, although confidently spoken of, are very unlooked for, and are, I think, fairly open to doubt. Devonshire.—Extremely local, frequenting cliffs and coves on the coast, more especially cliffs east of Sidmouth and Torquay.—J. J. Reading; Mr. Hellins has also taken it near Sidmouth. Dorsetshire.—Lulworth and Burning Cliff by Holworth.—J. C. Dale."

Taken this year (1870) in two new localities, at Swanage and near Tyneham.—T. Parmister.—"Entomologist," Vol. 3., p. 179.

In the "Entomologist," Vol. XI., is the following communication from myself: "This little butterfly has been very scarce this year (1878), but last year it was in greater profusion than ever I have seen it. The earliest I captured was on June 20th, the last on September 4th. It is more widely distributed than is commonly supposed, as I have taken it in various places on the Dorset coast, from Swanage to Preston Preventive Station, which is about two miles from Weymouth."

It was also met with in 1877, by Mr. Wacey, on Ridway Hill close to Upaney.

In the "Entomologist," Vol. XVI, Mr. Benson writes, "Some years back I took *Hesperia actæon* in some numbers near Truro, Cornwall, in good condition and quite unmistakable; but have not seen it there since."

In 1888, it was on the wing at Lulworth as late as the 13th of September. *Hesperia actæon* occurs at Lulworth in company with no less than four others of the Skipper family, viz.: *Sylvanus*, *Linea*, *Alveolus*, and *Tages*.

The best place is to the east of Lulworth Cove, on cliffs facing the sea. A little further on is a miniature undercliff. On this undercliff grows a mass of *Inula crithmoides*, below is the clear blue water of Weymouth Bay. In that little space, almost without moving, I have captured, or at least seen, no less than twenty-three of our British butterflies, viz.: *Pieris brassicæ*, *rapæ*, and *napi*; *Colias edusa*, with its var. *helice*; *Melanargia galathea*, *Satyrus semele*, *tithonus*, *janira*, *megara*, and *pamphilus*; *Chrysophanus phlæas*; *Lycæna corydon*, *adonis*, *alexis*, *agestis*, and *ægon*, and *Nisoniades tages*.

GENUS XXIII.—SYRICTHUS.

Boisduval.

This genus which is called *Thymele* by Stainton and *Hesperia* by Kirby contains over sixty species, all of which are black, chequered with white spots. About fifteen of them are European, but only one British. In the folded structure of the costal margin of the fore-wings of the male, *Syricthus* is closely allied to *Nisoniades*, from which, however, they are distinguished by their strongly tessellated wings. The obtuse tip of the antennæ, destitute of a hook, separate them from the other genera.

SYRICTHUS ALVEOLUS.

Spotted Skipper.

ALVEOLUS, Hub. *Alvè'olus*, a chess board, given in reference to the black and white appearance of the butterfly, which is chequered with somewhat square spots.

It is also called *Malvæ*, but the true *Malvæ* of Linnæus is apparently another species, according to the Vienna Catalogue, *Alcææ*, the caterpillar of which feeds on *Malva*.

This pretty little species measures from an inch to an inch and two lines in the expansion of its wings. On the upperside they are of a blackish brown, chequered with somewhat square white spots, and with chequered fringes. On the underside they are somewhat similar, the ground colour being greyish brown. A well known variety having the spots confluent was figured as long ago as 1717, by James Petiver, in his "*Papilionum Britannicæ Icones*," under the name of the Brown Marsh Fritillary. Lewin also gives three excellent figures of it in 1795, and calls it *Fritillum*, Fabricius. He records it as being but seldom met with in England, and that our know-

ledge of its manners is confined to the taking a few of them on the wing. He also goes on to say, this may not be a distinct species, but merely a variety in the white markings of its wings. It is described by Haworth as *Lavatera*, and figured as such by Newman. It has been taken in Dorsetshire and other parts of the south of England, but is considered to be very rare. A still more extreme form of this variety is figured in Moseley's "Illustrations," from a specimen in the collection of Mr. Howard Vaughan, and called *Taras*, Meig. Both these later names apparently represent the same form, which Kirby calls *Fritillum*, W.V.

Both the type and the variety are subject to still other variations; the former frequently occurs with all the spots on the anterior wings very minute, while those on the posterior are remarkably large, and *vice versa*. Again, the variety occurs with the upper wings nearly all whitish or cream-coloured, with a single whitish spot alone in the centre of posterior, while others have a central and marginal fascia of spots.

In Mr. Stephen's collection was a specimen having the character of *Alveolus* on the anterior wing, and of *Lavatera* on the other; and he also preserved a series gradually varying from the confluent to the simple spots on all the wings. Another named variety, *Melotis*, Dup., occurring in Syria, is larger, and has the hind-wings all white on the underside.

The egg is globular, with base rather flattened; the shell ribbed rather irregularly with about eighteen ribs, and transversely reticulated with very even fine lines: the colour is a very fine pale green all over.

The young caterpillar makes its escape by cutting a large round hole through the top of the egg; in colour it is very pale green, with a shining black head. When full-grown, the length is rather over five-eighths of an inch, the figure very stout, the head horny, globular, and stuck like a knob on the second segment, which however, is not so strikingly narrow as in *Nisoniades tages*; the skin granulated in appearance, the head and whole body covered with short fine pale hairs; the general colour a pale ochreous green, the second segment pink, the lines faintly darker than the ground colour; the head dark brown.—(Mr. W. Buckler). It feeds on the barren strawberry (*Potentilla fragariastrum*), the wood strawberry, the raspberry, and the bramble.

The chrysalis is enclosed in a case between two or three leaves, similar to that in which the caterpillar lives, but fastened with stouter silk, and the openings protected by a loose pale yellow webbing. Its length is not quite half an inch, the figure thick and stumpy; the eyes prominent; the wing cases well developed; the whole skin rather rough, set with short stiff hairs of a light brownish red; the ground colour is a reddish grey, on which are

situated some black marks and spots ; the spiracles are ringed with black and placed within the largest dark blotches.

The butterfly appears in May and June, and has been taken both in the end of April and the beginning of July. The caterpillars emerge by the end of June, and are full-fed in September. They remain in the chrysalis state over the winter.

S. alveolus occurs all over Europe except the extreme north, in Asia Minor, and North Africa. It is abundantly distributed in England and Scotland south of the Clyde, and has been met with at Galway in Ireland. It was first described as a British species in Ray's "Historia Insectorum," 1710 ; after describing it, he goes on to say, "Maii 29 in pascuis loco palustri inneni. Quarti generis Papilionum a nobis observatarum speciei primæ persimilis est quoad colores, sed multa minor."

It is figured and described by Petiver in his "Papilionum Britannicæ Icones," 1717, under the name of the Small Spotted Brown Marsh Fritillary.

Moses Harris, in his "Aurelian," 1778, writes, "Grizzle.—The whole fly is of a dark lead colour, speckled all over with small square specks. The fringes are chequered black and white. The underside is similar to the upper ; but the inferior wings are paler. Roesel says, the caterpillar is found on the common mallow, inclosed in a web ; that it lays in chrysalis eleven days, and that the fly, when it appears from the chrysalis, produces blood from the abdomen. See Linn, Papil. Pleb. 267, *Malvæ*."

Wilkes, in his "English Moths and Butterflies," 1773, figures for the Grizzled Butterfly, the butterflies and chrysalides of another species, also the caterpillars feeding on a plant of mallow ; and writes : "Mr. Roesel tells us, that the caterpillar of this fly was found on the mallow, with the leaves of which he fed it till the end of June, when it spun a web amongst the leaves, and changed to a chrysalis, the butterfly of which was bred the May following. This fly is to be taken in woods and meads, at the beginning of May ; and although small, it flies swiftly, so that you must be very quick to take it."

Donovan, in his "Natural History of British Insects," likewise figures another species, and writes "The larva of this butterfly feeds on the mallow ; the colour is greyish or yellowish, with the head black, and a black collar marked with four sulphur coloured spots. The pupa is somewhat gibbous and bluish. This insect is common in many parts of Britain in the fly state ; the larva, though known, is by no means common. The butterfly appears on the wing in May. Some collectors admit two or more varieties of the Grizzled Skipper Butterfly, while others consider them as so many distinct species : the male also differs from the female in being somewhat smaller."

The foregoing will show how much better it would have been for Harris, Wilkes, and Donovan, not to have copied from Fuesel : and that our species is not the *Malva* of Linnæus, which now goes under the name of *Alcea*, Esp.

Lewin, in his "Insects of Great Britain," 1795, writes, "Spotted Skipper. *Malva*, Linnæus. The caterpillars of this butterfly feed on the leaves of the bramble bushes. They web the edges of the leaf together, and from this cover they come out a little way to feed; but the least motion of the leaf they return to their retreat, and if they be much alarmed, they drop to the ground. The end of April they are full-fed, when they enclose themselves in a slight web, under cover of a leaf, and there change to chrysalis. In that state they remain about fourteen days, as the fly comes out on the wing the beginning of May. The butterfly is pretty common in the dry parts of woods and heaths."

Haworth, in his "Lepidoptera Britannicæ," 1803, writes of *Malva*, "That it frequents pastures."

Curtis, in his "British Entomology," 1833, writes, *Alveolus*, Hub.—*Malva*, Haw.—*Cardui*, Goda.—End of May, beginning of June, meadows, commons, woods. *Malva*, Linn. I have found at Toulon, and believe it is not British, although Donovan's figures appear to be this species."

Stephens, in his "Illustrations of British Entomology," 1828, writes, "An elegant, variable, and far from uncommon insect; frequenting woods, commons, dry banks, and meadows, about the end of May, near Newcastle common. In the fens of Cambridgeshire, plentifully. *Malva* has considerable resemblance to *Tagis*, but is easily known by its dentated wings. This species has doubtless been introduced into the indigenous fauna by Stuart, owing to the unfortunate misappropriation of the Linnæan name to *Alveolus* by his predecessors." In a manuscript note in my father's handwriting is "In the Linnæan cabinet are 2 *Malva* large and 2 *Alveolus* small put in as 4 *Malva*."

Haworth, in the old "Entomological Transaction," 1802, records another species, *Orleus* (The Georgian Grizzle), as being taken in Bedfordshire, by the Rev. Dr. Abbot. Evidently a mistake.

GENUS XXIV.—NISONIADES.

Hubner.

A genus of about fifty species, of which but two occur in Europe, and only one in Britain. They are mostly brown in colour, with ash-coloured undulating bars. The males have the costal margin of the fore-wings double, or

folded, the inside of the fold being covered with fine downy hairs, as in the last genus, from which they may be distinguished by the fringe of *Nisoniades* not being chequered. The antennæ are short, but longer and more slender than in *Syrichthus*; the club attenuated at the tip, not hooked. The butterflies of this genus sleep with their wings deflexed like a moth, not erect like other butterflies. Curtis remarks on the Skippers in general, "These singular insects approach the *Sphingidæ* in the extreme length of the maxillæ, and the *Noctuidæ* and *Phalænidæ* in their metamorphoses and doubly spurred posterior tibiæ. The palpi are so densely clothed with scales and so very tender, that although the relative proportions are correct in fig. 4. a., the outline may vary a little. It is rather remarkable that old specimens have frequently lost one or both of their palpi, an accident I have never observed in other Lepidoptera, excepting a few of the *Pyralidæ*. Boisduval bestowed the name of *Thanaos* a corruption of *Thanatos*, death, in allusion to the dark colour of the species.

NISONIADES TAGES.

Brown Skipper.

TAGES, Linn. Ta'ges, a son of Genius, who first taught the Etruscans the art of divination. Linnæus probably chose this name for one of the Ruriculæ, because the story is told of *Tages* being found by a rustic while ploughing: hence a clod-hopper.

This, the last of our British butterflies, sleeps with its wings deflexed like a moth. It is of a dullish brown colour, with marginal rows of small pale dots; two obscure greyish bands on the fore-wings, and one on the hind-wings. On the underside, the colour is uniformly greyish brown. The width across the wings varies from an inch to an inch and a quarter. The male is more dusky and uniformly coloured than the female. The grey markings on the wings are sometimes more clearly defined in some specimens than others: the costa also has sometimes a bright white spot towards the tip, anterior to the band of zig-zags, and a spot or two in the band: otherwise it is remarkably constant to the type. A form named *Unicolor*, Fu., which as its names implies is unicolorous on the upperside, occurs in Greece and Western Asia. Another, named *Cervantes*, Grael., is found in Andalusia. It is larger than the type, and is more obscurely marked.

The egg is of a somewhat elliptical figure standing on end, and is pale green in colour.

The caterpillar is of a yellowish green, with two yellow lines on each side,

and a row of black dots above them: the head, like that of the rest of the family, is large, and is of a purplish brown colour: The spiracles are very small and red. When full-grown it is nearly three quarters of an inch in length, with the back a little arched and the belly rather flattened: the body is very plump, and thickest in the middle segments. It feeds on the Bird's-foot Trefoil (*Lotus corniculatus*).—(Mr. W. Buckler on "Larvæ" by the Ray Society.)

The chrysalis is smooth, without angles, the thoracic segments being swollen and of a dark green colour; the body is tinged with rosy red; it is conical and pointed. (Newman.)

The butterfly emerges in May, and it continues on the wing till June is well in. The eggs are laid on the food-plant, and as soon as the caterpillar is hatched, it conceals itself by drawing the leaves together. In the South of England, a second brood emerges in August, and the caterpillar lives over the winter; but there is only one brood in the North, and it passes the winter in the chrysalis state.

Nisoniades tages occurs all over Europe, except the Polar regions, in Northern and Western Asia, and Asia Minor; frequenting dry sunny places.

It is common all over England, and the South of Scotland, but occurs as far north as Invernesshire and Rosshire. It also occurs in Galway and probably other parts of Ireland. It appears to have been known as British as long ago as 1667, for Dr. Christopher Merrett gives the following description of a butterfly in his "*Pinax rerum Naturalium Britannicarum, continens vegetabilia, Animalia, et Fossilia, in hac Insula repecta inchoatus*," viz.: "*Corpore, pedibus, capitulo, antennis, cineritiis*."

It is described by John Ray in his "*Historia Insectorum*," 1710; and figured and described by James Petiver in his "*Papilionum Britannicæ Icones*," 1717. Petiver records it thus, "*Papilo niger fuscus Hampstediensis marmoratus*. Handley's small brown butterfly. It is brown above and paler below, and dully marbled."

Moses Harris, in his "*Aurelian's Pocket Companion*," 1775, records it as haunting woods, heaths, and meadows.

Lewin, in his "*Insects of Great Britain*," 1795, writes, "This species of butterfly is to be seen flying the beginning of May, in the dry open parts of woods, and the sides of roads and lanes. It delights to settle on the ground to sun itself. The caterpillar is not known. In the male and females flies there is little or no difference, either in colour or markings."

Haworth, in his "*Lepidoptera Britannica*," 1803, records it as frequenting woods and meadows in May; unfrequent near London, but more frequent in in Norfolk.

Stephens, in his "Illustrations of British Entomology," 1828, writes, "Not a very abundant species, frequenting dry banks, wastes, commons, heaths, and woods, about the end of May and the middle of July: rather plentiful on Hertford Heath and at Darenth, and abundant at Coombe Wood, near Dover."

Curtis, in his "British Entomology," 1833, writes, "Beginning of May, June, and middle of July, meadows, dry heaths, banks, and road sides in various parts of England and Scotland."

The Rev. F. O. Morris, in his "History of British Butterflies," 1853, writes, "I have taken this Skipper in plenty near Charmouth and Lyme Regis, Dorsetshire and Devonshire. It is very abundant in Raydon Wood, Essex, and, in fact, in most parts of England. In Ireland it is plentiful near Galway; it is taken also in Scotland in different parts."

Newman, in his "British Butterflies," 1871, writes, "It is particularly plentiful in flowery chalk banks in Kent, Surrey, and Sussex. In England it occurs in every county list I have received."

ADDENDUM.

Since the previous pages appeared a new butterfly has been added to the British List, viz.

HESPERIA LINEOLA.

LINEOLA, OCH. Resembles *Linea* in size and colour, but the club of the antennæ is yellow, with a black tip; the hind wings are unicolorous beneath instead of the inner margin being fulvous. The black streak on the fore-wings of the male is shorter and quite straight, sometimes it is wanting.

The caterpillar is yellowish green with fine yellow lines on the back, and a yellow line along the sides. The range of this species is more extensive than that of *Linea*, as it is found throughout Northern Asia, as well as in Europe and North Africa, but it has only recently been recognized in England. It occurs in meadows in July and August, and is generally commonest along paths by the side of corn-fields.

It was first recorded as a British species in the Entomologist for January, 1890, by Mr. Hawes, as occurring in the County of Essex. Mr. Whittle also records it in the February number as occurring in abundance in July, on the marshes near Purfleet, close to Shoeburyness.

I have been on the watch for this species myself for years, and have come to the conclusion that it does not occur in the West of England. It is probably an Eastern not a Western species in Britain.

CORRIGENDA.

- Page xv.—Line 5. For “chysalides,” read “chrysalides.”
- „ xviii.— „ 36. For “to that,” read “instead.”
- „ xxiii.—Between lines 37 & 38 insert “1795, Typhon. Lewin’s
Insects of Great Britain.”
- „ xxvii.—Line 2. Add “South of the Humber.”
- „ xxvii.— „ 3. Add “South of the Humber.”
- „ xxvii.— „ 23. For “South-west,” read “South Coast.”
- „ xxix.— „ 17. Insert “*rubi*.”
- „ xxxiii.— „ 6. After “belonging,” insert “to.”
- „ xxxiv.— „ 7. For “1858,” read “1868.”
- „ xxxiv.— „ 30. Insert “The mean on January 6th and 7th,
1890, were as high as 49’ 9” and 51’ 6”.”
- Page xxxvi.—Line 36. For “*Napi*,” read “*Brassicæ* and *Rapæ*.”
- „ xxxvii.— „ 14. For “*Tabinidæ*,” read “*Tachinidæ*.”
- „ xxxvii.— „ 36. For “readers,” read “members.”
- „ xl.— „ 9. For “England,” read “Ireland.”
- Page 10—After line 38 add—“and at Dover. A few specimens were
also taken on the East Coast of Kent in 1887.
See Ento. Mo. Mag., Vol. xxiv.”
- „ 26—Lines 27 and 28. Strike out the sentence beginning with
“but,” and ending with “facts,” and insert—
“Mr. McLachlan, in Entomologists’ Monthly
Magazine for August, 1879, page 51, records
living chrysalides, the produce of eggs laid in
1877, and thinks that its life in that stage can
be prolonged over several years.”

- „ 54 — „ 9. Strike out “diminutive of Argos, a City of Greece,” and read—“from Argos, shining, in allusion to the silvery appearance of the underside of the wing.”
- „ 72— „ 10. After “colour,” insert “with raised glistening white reticulations, having projecting knobs at the knots. The caterpillar when full grown is of a dark green.”
- „ 72— „ 36. Strike out “Hoy, the most northerly of the Shetlands,” and insert “The Orkney Isles, where it has been met with both on the main island, and at Hoy.”
- „ 73— „ 22. For “Alexis,” read “Medon.”
- „ 73— „ 24. For “Alexis, Scop,” read “Medon, Esper.” As Scopoli grouped together two or three species under the name of Alexis, it is impossible to tell which he meant by the name.
- Page 97—Line 36. For “*Rhagus*,” read “*Rhogas*.”
- „ 104— „ 35. For “*Calorii*,” read “*Caloris*.”
- „ 127— „ 1. For “Cranor,” read “Cramer.”
- „ 127— „ 11. For “Petiner,” read “Petiver.”
- „ 174— „ 8. For “1877,” read “1887.”
- „ 192— „ 24. For “Puby,” read “Parley.”
- „ 196— „ 18. For “Sandwich,” read “Sandrock.”
- „ 199— „ 2. For “Fitillary,” read “Fritillary.”
- „ 199— „ 3. For “Omai,” read “Omri.”
- „ 211— „ 4. After “Italy,” add “or from *Hespera*, the evening; the *Hesperidæ*, forming the connecting link between the Diurni and Nocturni.”
- „ 216— „ 29. For “Häg,” read “Hog.”
- „ 217— „ 37. For “*Sylvaticum*,” read “*Pinnatum*.”
- „ 218— „ 37. For “Upaney,” read “Upiney.”
- „ 222—After line 11 insert “*Syricthus* from *Syrex*, a pipe, some of the markings being supposed to resemble a Pan’s pipe.”

., 222—After line 34, insert "*Nisoniades*, perhaps an error for *Bisoniades*, resembling a bison, given in allusion to the shaggy and heavy appearance of the species."



Hartlepool :

PRINTED BY B. T. ORD, PRINTER, 69, HIGH STREET.

**RETURN
TO →**

ENTOMOLOGY LIBRARY

210 Wellman Hall

642-2030

LOAN PERIOD 1

2

3

14 DAYS

4

5

6

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS

DUE AS STAMPED BELOW

[illegible]

UNIVERSITY OF CALIFORNIA, BERKELEY
FORM NO. DD 12, 2.5m, 11/78 BERKELEY, CA 94720

U.C. BERKELEY LIBRARIES



C037126192

